DOCUMENT RESUME

ED 062 675 24 CG 007 247

AUTHOR	Verplanck, William S.
TITLE	Operation-Analysis in Application to a Learning Technology for Schools. Final Report.
INSTITUTION	Tennessee Univ., Knoxville.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
BUREAU NO	BR-9-0116
PUB DATE	Mar 72
GRANT	OEG-4-9-520-16-0036-057
NOTE	174p.
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	*Data Bases; Data Processing; Indexing; *Information Processing; Information Retrieval; Information Services; *Information Sources; *Information Storage; *Information Systems; Information Utilization

ABSTRACT

The task of this program was very extensive and could not be completed in the time allotted. A major and effective start has been made in every category of effort, and the foundations for the complete framework of the methodology of operation analysis for summarizing, and recovery of experimental reports have been laid. These include the following. (1) A basic terminology for the descriptive report of experimental procedures has been completed. (2) The greater than fourteen thousand-item literature in Psychological Abstracts on conditioning and simple discrimination learning has been reviewed, summarized, and coded. (3) Two further parallel procedures for the analysis of experiments and their findings have been developed. (4) A sample of the published literature has been operation-analyzed for adequacy, and already reported upon to the U. S. Office of Education. (5) The published literature on behavior modification of children up to December, 1965 has been analyzed and summarized. (Author/BW)

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OPERATION-ANALYSIS IN APPLICATION TO A LEARNING TECHNOLOGY FOR SCHOOLS

William S. Verplanck
University of Tennessee
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MARCH 1972

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The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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SUMMARY

Many of the topics that might have been included in the final report on this contract have already been presented in a request for extension dated 30 September 1969. The reader is referred to that report.

The task of this program is a great one, and it could not be completed in the time allotted. A major and effective start has been made in every category of effort, and the foundations for the complete framework of the methodology of operation analysis for summarizing, and recovery of experimental reports have been laid. Specifically:

1. A basic terminology for the descriptive report of experimental procedures has been completed. This is compatible with both the customary terminology in psychology, and with a far larger psychological vocabulary that has not the subject matter of this project.

2. The greater than 14,000-item literature appearing in Psychological Abstracts on conditioning and simple discrimination learning has been reviewed, summarized, coded, and placed on IBM cards. Mechanisms for the computer recovery of bibliographies under more than 100 subcategories ("conventional headings") have been developed; a system for making generalizations from these, in a computer-storeable language is in development. These cards have been prepared from the abstracts, as they appear in Psychological Abstracts.

3. Two further parallel procedures for the analysis of experiments and their findings have been developed.

A. An analysis sheet, for the summarizing of experimental reports as they are published has been developed and used, both in full, and in short form. Manuscripts of manuals for the use of such sheets have been carried through several drafts. One of these manuals is very extensive, the other, in briefer form, is designed for the guidance of experimenters in designing experiments, and in writing up papers reporting them as well as for the analysis of research.

B. An earlier coding system using symbols has been replaced by an alphanumeric coding system, which will permit the statement of the major process operations conditions, and outcomes of an experiment, as well as the experimental design, in approximately 17 columns of an IBM card for each group. This code is still being developed.

4. A sample of the published literature has been operation-analyzed for adequacy, and already reported upon to USOE, in the request for revision.

5. The published literature on behavior modification of children up to December 31, 1969 has been analyzed and summarized.

Of the items proposed in the original Proposal (App. One), we have completed some, and are still on the way towards completing others. Much of the work reported here has had to be done after the termination date of the contract, and has been supported by the two Universities.

A.

The final report on this contract has been greatly delayed, since the initial proposal. By the end of its year's life, with extension of time, experience had changed the direction of some parts of the original plan, and the scope of the work necessarily expanded. A request for revision dated 30 September 1969 summarized much of the first year's work, and indicated these new directions.

Since the termination date, work has continued on Operation Analysis, and it has become progressively more difficult to decide just when a "final report" could be meaningful. But one must be submitted, and here it is, in brief form.

Problem and Objectives

The initial goal was the recovery of experimental results pertinent to the problem of human learning and education. In the period since this goal was set, a very large number of researches on the application of some operations in the school have been done and reported upon in the published literature. This research, on "behavior modification" or "precision-teaching" in the schools illustrates the successful application of simple operations to educational problems on the one hand, but it shares the limitations of the published literature on behavior modification that will be described later in this report.

The major finding of operation analysis is a disheartening one. Except for research specifically done with children, and in the schools the published scientific literature is so badly and incompletely reported, and the experiments so complex, that it is doubtful whether there is in experimental psychology a detailed body of knowledge that can be applied in the schools. We must advance to a new and simple, an operationally sound, methodology and conceptual frame.

One consequence of these findings of the work done in this contract in Appendix A1, the paper "What is a Dissertation", and Appendix A2, the draft of another such paper, - specifically, on concepts.

Operation Analysis shows that, where education is concerned, experimental psychologists may need to start all over again, except where they have worked directly with children.

Results

The goals of this research program were stated in its abstract, under ten headings. The balance of this report will state precisely where the general program of operation analysis now stands on each score. It is impossible at the present time to state precisely at what point in the process reported under each of these headings the support of U.S.O.E. stopped. The work has been continuing independent of such support, but necessarily on a smaller scale.

Results

In this report of results, we follow the numbering and ordering of the ten headings outlined in the abstract of the grant proposal. Each section quotes the abstract.

(1) "Use of an extended rigorous operational vocabulary."

Terms, specifically required for development of a vocabulary for the operational analysis of experiments, have been chosen and defined in a far broader operational vocabulary. The adequacy of these terms in relationship to that broader vocabulary has had outside review. These terms are listed in Appendix B.

(2) "Preparation from "Psychological Abstracts" of a set of IBM cards one for each abstracted paper on experimental research on learning preference."
(3) "Computer-printout of bibliographies incorporating all the paper so summarized from "Psychological Abstracts", categorized within the appropriate one of approximately 100, selected from a total of 200 identified conventional categories."

To date, the abstracts of approximately 14,000 articles concerning simple learning situations have been read, and coded according to one or more of some 200 traditional topic headings. A sort and merge program has been written that enables rapid retrieval of the bibliography on anyone of these topics or on combinations of them. Bibliographies displaying the results of such a sort are useful especially during the early stages of analysis. For example, the present listings on "secondary reinforcement" can be scanned for articles relevant to specific issues such as secondary reinforcement based on primary negative reinforcement. A further modification of the program displays the general format in which publication could be made for use of the scientific community. It contains several components as follows:

a. First is a narrative description of the area, defining the relevant operations to be included in the summary. Additional statements attempt to relate the area to other topics that would ultimately appear in comparable format.

b. Next in the bibliographic listing of the relevant articles as determined from the search of the coded files.

c. There follows a series of statements abstracting the significant features of the experimental findings. These may be thought of as the facts as supported by available research.

d. The next listing is the critical aspect of the project, namely the summary of the empirical evidence into a shortened list of statements intended to identify the generalizations (laws) indicated by the empirical facts. These statements are, in effect, inductions from the more specific facts in an effort to organize knowledge at a more abstract level.

e. The laws are followed by a list of references indicating the articles that are relevant to each statement.

f. Finally, there is a listing of the theoretical statements that have been proposed as a basis for conceptual understanding of the various phenomene in the topic area. (See Appendixes C & D)

(4) "Study of the original papers, with detailed critical analysis of the methodology of each experiment falling in a selected set of these categories."

The systematic return to the original paper in the categories was not accomplished during the period of this grant. However, a systematic analysis of a specific category of paper was undertaken and will be described under (7) below.

(5) "Simultaneous identical analysis of a set of papers randomly sampled from the psychological literature."

In the request for revision, we reported on a sample of the published literature in a number of scientific journals. Our evaluation of that sample revealed that, in general, reports were too incomplete and that the process operations followed were too complex to permit generalization beyond the specific experiment. To counter this lack of completeness in reporting overcomplexities, we undertook to revise our operations analysis manual and analysis sheet and to create a guide-key for them. The revised summary sheet and guide-key were designed specifically to aid experimenters to clarify each of the decisions they had made in designing and executing the experiment, and to guide them in writing reports of their research. The revised manual concentrates on ensuring the completeness of a report beginning with the adequacy of subject selection methods, the choice and range of specific events to manipulate in carrying out an experiment, precision of methodology, complexity of method (and hence appropriateness as a basis for generalization) and the completeness of analysis of data. These refinements enable those who use if for analysis of the work of others to exhibit in a straightforward manner many of the limitations that must be placed on the significance and general applicability of a given experimental outcome because of deficiencies in experimental design, methodology, or report and permit others to avoid such difficulties. (These forms are presented in Appendix E). We are presently preparing for publication a very brief manual to be used by both authors and reviewers of experimental papers. This addition to our system should, if it is used, improve the completeness of published reports of experiments.

(6) "Systematic summary in operational notation of the papers so selected from these bibliographies."

The development of a notational system with the capacity of abstracting the procedures and variables required for the description of the operations carried out in the experiment, and of the events on which they were carried out is not complete.

The complexity of experiments has forced us to review and revise our initial notational system. The three provisional systems reported in the request for revision, while capable of accomplishing the task, have all proved to be unwieldly to handle. A new revised computer-compatible system is presently under development and is presented in rough form in Appendix F. In its present form, it is immediately applicable to many experiments. It now needs revision to enable it to deal with some of the more bizarre combinations of operations that have been carried out since automated equipment enabled subjects to be run through hours of changing conditions.

(7; 4b) "Search among the products of these analyses for empirical results having direct implications for the methodology of the operations to be carried out in the classroom."

In a program such as this one, which aims to develop a general systematic analysis that will have direct application to the problems of education, it is more than a little difficult to accomplish distant goals in an abbreviated time. Some operational principles applicable to the classroom were reported in the request for revision. Still further ones are under review but due to lack of funds progress has been slow. It would be inappropriate to present speculative findings. A more immediate goal was substituted: the detailed analysis of a particular set of the literature especially pertinent both to children, and to operation-analysis.

One hundred sixty eight published reports of experiments on behavior modification were Operation-analyzed. These papers constitute the complete literature published up to the cut-off date of 31 December 1969. The 168 papers were found in 39 journals and 4 books.

The criterion for inclusion of a research in the analysis was that the subjects in the experiments be children, or adolescents, or both, and that they not be classifiable as autistic, brain-damaged, schizophrenic, or retarded. Ninety percent of the subjects reported upon presented a specific behavior problem. The demands and limitations of this specialized literature permitted the development of a brief analysis sheet which enabled all reported pertinent information to be summarized on one sheet. Such a sheet, filled in, is presented as Figure 1. These sheets were then coded, and a descriptive enumerative analysis of the categoric operations and conditions were made.

Since 1 January 1970, there has been a tremendous volume of further research reported on children with behavior problems. In these past two years or so, a very considerable number of papers or research carried on in the classroom with 'normal' children has also appeared. "Precision teaching," which is a very recent development, is barely touched upon in the literature reported upon here.

With these limitations noted, the following summary is presented of our findings in the literature up to January 1, 1970.

(A) Operation analysis shows that this literature, like most of the psychological literature, is badly reported, to the extent that the replication of a given experiment is all but impossible.

(B) No fewer than forty-five different environments, objects, or events (stators and transients) were utilized as stimuli, and one hundred thirty eight different identifiable responses or response-classes were reported upon.

(C) Almost without exception, behavior modification with children is limited to research using positive reinforcement, with great and unsystematic variation in details. Only eight instances of a-omission training, (which produces avoidance conditioning) appeared in this extensive literature. This perhaps reflects a systematic ethical point of view on the use of aversors with children. There are almost no instances of the use of discriminal operations. These lacks emphasize the failure of researchers systematically to explore the possible methods for effective yielding of behavior changes.

(D) The diversity of conditions of the experiments reported upon is such as to make any quantitative statement on the magnitude of effects meaningless. Qualitative statements on direction of change in rates or responding are possible.

(E) The experiments reported differ from one another in a welter of detail. Their primary finding, that dependence operations utilizing positive reinforcers are effective, is vitiated by the very absence of negative evidence. As might be expected, negative results are not reported upon. Given this limitation, the literature shows that this operation is effective in modifying behavior independently of the particularities of specific stimuli response-classes, and of the reinforcers. They need only be identified.

(F) The experimental procedures followed characteristically combined a series of operations, sometimes applying them in temporal sequences following a transfer paradigm, and sometimes applying them concurrently over the same interval of time. This diversity is unsystematic; it has developed as a matter of convenience, or for lack of precedent. It does not enable the development of more efficient procedures, nor does it yield data that might make systematic use of the transfer paradigms meaningful.

(G) There are no instances in this literature of systematic attempts to find behavior changes in situations other than the experimental one, or of follow-up study of subjects after the termination of the experiment. There is an absence of evidence on the generalization to other environments of the behavior changes produced by the procedures in the place where they were carried out.

In sum, the operation-analysis of the literature up to 1 June 1970 on behavior modification with children having behavior 'problems' demonstrates unequivocally (1) that the effectiveness of the operations carried out is independent of the specific conditions of the experiment, (2) that inadvertant failure of editors to maintain or to require standards of reporting is such that an experimental finding might be verified by precise replication, and (3) that writers and editors may suppress needed data by leaving negative findings unpublished.

The failure to publish or otherwise to give public account of lack of success in producing changes in different behaviors by use of similar social reinforcers is unfortunate. The published literature leaves those doing historical or critical research on behavior modification on a schedule of regular reinforcement. They will find no negative instances until they themselves undertake to carry out behavior modification. They hence are not likely to establish any discriminatory standards, badly needed though these may be.

(8) Reclassification of the papers so examined on the basis of operations performed in them. We have not done these, other than as presented in Appendix D.

(9) Analysis parallel to 4 & 6 above using solely abstracts, and conventional rubrics.

The extensive bibliography on Differential Conditioning was generated at the University of New Mexico using the IBM sort and merge system described in subsection 2 & 3. Only this one area has been so analyzed to illustrate the form of analysis. Stated in the language of Dr. Logan's vocabulary are the phenomena that appear to be established on the basis of the available research in this area.

This analysis allows relevant insight into the traditional category enabling the observation of exactly what has been done (both well and poorly) and what has been ignored.

(10) The development of two sets of empirical generalizations, one based on operations and the other on conventional categories of thought, with relative evaluation of the two systems, especially with reference to the comparative usefullness of the empirical generalizations found, in their application to education. Not completed.

* * *

Although this is technically a terminal report as related to the present availability of supporting funds, it is in fact an interim report of a continuing project aimed at rethinking the reported literature into operational categories based on exactly what was done. This report is hence essentially a listing of the progress made to date.

The necessity for rethinking, as well as the delay in getting a more comprehensive start on rethinking derivable from the dual problems of both incompleteness and overcomplexity of the published literature.

The experimental literature as it now exists seems to be a seemingly endless repetition of the same operationally overcomplex experiments, done over and over again with minor variations. This situation has led us to question the stereotypes both of psychological experimentation and of the methods currently used for "theoretical" explanation and extrapolation.

Appendix A-1

AN "OVERSTATEMENT" ON PSYCHOLOGICAL RESEARCH

WHAT IS A DISSERTATION?

The face, the form, the content, of psychology both as a science and as a profession is changing, and changing rapidly. We are passing through a period when irreversible developments are occurring that will alter the daily activities of very many of us, whether in teaching, research or the application of our findings in society. If they have not already done so.

This is long overdue.

It is not an identity crisis, - we have never been seriously puzzled by the questions who we are, and what we are doing. The experimental psychologist has always had his image: He is an experimentalist. He studies scientific methodology. He is a "scientist" - (read physicist). Nor has the clinical psychologist had any serious image problem. He has been Janus, - facing two ways . . . on the one hand he is a scientist (read an experimental psychologist). On the other hand, he is a professional (read physician).

The "pure" types, through their reading of philosophies of science, have become imitation physicists. The "clinical" types, through their somewhat different reading, and through their undergraduate and graduate training have followed the lead of imitators of physicists.

This may appear a harsh and overstated judgment. But the puny achievements of psychology surely indicate that something has been wrong, something lacking. We have learned to do some things very well. We have generated almost nothing by way of stable basic principles, although some are stated that are so vague as to be all but inapplicable to the specific case. We have very little to show for years of "experimental research." There is stupendous volume of experimental literature, to be sure, - much of it relevant either to physiology or to the technical achievements of the physical sciences. But not to the behavior we encounter every day. Not to teaching children, not to aiding others. Not even to speeding the "recovery of the patient."

With few exceptions, innovations, and innovative thinking have come, not from experimental-theoretical breakthroughs by people in the immediate field, but by accident (rauwolfia), by desperation (crisis intervention), and especially in the clinical field, by borrowing. "Outsiders" of one sort or another have produced. Chemists. Ethologists. Tim Leary. In clinical problems the outsiders include non-clinical psychologists: the "social-industrial" psychologists; the Skinnerians.

One may ask why. Here's one man's opinion, - it can at least serve as a basis for argument.

Psychology has, in a very real sense, never been a science in its own right, - developing its own research methods and techniques from its own data. Late to develop as a science, it has borrowed uncritically the concepts of earlier, more fully-developed sciences, and their experimental and research methodologies. We have tried, by emulating the late stages of the development of physics, and by leaning on statements based on the self-examination of philosophers (whether Locke and Hobbes, - or Leibniz and Kant) to bypass the critical first-stage in the development of every science, - the period of observation and description. The critical period which, in chemistry overlapped with the long history of alchemy, and in astronomy with astrology. The period when, in biology and geology, expedition after expedition moved over the face of the globe, and individual scientists dedicated themselves to the painstaking gathering, description, and classification of specimens, gathering on hands and knees, in tents, through whole seasons and years. Our museums filled up. In the scientific literature of these fields, hundreds, - hundreds upon thousands, - of dissertations consist in the observational data yielded by gathering, describing, and classifying natural phenomena, - descriptions of flowers, or rocks, of insects, - of tribes, ruins, artifacts.

This is in marked contrast with the psychologist's "experimental" methodology. It is now about time we considered the possibility that we need to go back and start over again, - or for at least some of us to. It's about time (at least 100 years late) to start doing what psychologists should have done in the first place. Finding out what and where and when, which people - living objects - do, and 'think', and 'feel' specific things.

It's about time more of us started on the straightforward job of developing a descriptive methodology. The job of recognizing that observing and reporting upon the functioning of an individual, of individuals in a group, of groups, and of social method, constitutes research and yields scientific data and statements. No "experimental design". No "independent variables." No, not even any "controls", in any conventional sense. If an experiment at all, then simple-minded ones, with minimal assumptions, statistical or otherwise.

Solely, the serious, accurate, unbiased ('objective') description and classification of observations, and the report thereof.

* * * *

A dissertation is a report of research. And research - the research most desperately needed now, - is descriptive research. "Public-phenomenological" research. Research that generates hard, indisputable, unambiguous statements, or numbers, or television tapes. This, I think, is what we mean by facts. Their generality, that is, the relationship of a new set of facts to other already established facts, will need to be demonstrated. How generality can, and should, and will be established, will depend in each instance, on the specifics of the observations.

Why this memo, now? The immediate instigation is hard to specify, - but perhaps it's a question of putting your money where your mouth is, - or vice versa.

It is certainly, not an "off the top of the head" phenomenon. It's one man's reaction to teaching the history of psychology in the context of the other sciences, to facing unanswered questions, and to wondering why so much effort by psychologists has yielded so little of empirical, theoretical, and social value. It comes from the desert that operation analysis seems to reveal. It comes from questioning "information theory", - Chomskyian bathynoetic fantasy, "inferential" (but not descriptive) statistics, Experimental Design, and the many other fads and bandwagons that have marked the listing of our science - respectable vacua all. It comes from possible new kinds of things, - from innovative, exploratory, and challenging viewpoints. From the strides made and achieved through the purely observational methods of ethology; from the as yet limited domains in which simple experimental procedures have been carried out. From asking how the fresh interests and activities directed toward, and carried out in the Community can contribute.

And it was said a couple of weeks ago, in the 'ad' for a Social Psychologist. Its implicit criticisms of "social psychology" apply

not equally well,
but
even more

to experimental, industrial, and clinical psychologists.

Observational and descriptive research is not solely "acceptable," - it is indispensable. It is needed. Let's get started on it.

Research that will make Social Action possible, and plausible.

Let's have innovative research. Live dissertations. Dissertations on what people do, and say, and think in this real world, and not solely in the 8X8 soundproof cubicle, or on the answer sheet for the set of questions.

Let's work towards developing methods that will enable the "new" to stand as respectable, and as valued as the "old" which will continue.

It should be no wonder that Herman Hesse turns people on, - and that tarotology and astrology can be accepted by "the Young" with more conviction than either the JEP, or the Psychoanalytic Quarterly.

WILLIAM S. VERPLANCK

rough 03-06-72

Appendix A-2

Remarks On Research on "Concept Formation": ~~and sticky~~ [illegible]

~~Remarks on the Unidentifiable:~~
~~Specifically,~~ Research ~~and Books~~ on
"Concept Formation", ~~- (including~~
co~~ncepts studied like wa~~llpaper, by
~~sticky-resistance~~ on a wall)
s~~tacking instances~~

(A Review of Some Unidentifiable Books and Papers)

Through the past three or four years, ~~I have been doing some hard (and [illegible])~~ thinking about experimental psychology and its achievements in the scientific community, in society, and in the development of human knowledge, broadly conceived, may have been moving in some unexpected directions

Research on concept formation over the past years (since Hull in 1918 or so, ~~[illegible]~~ including much of ~~his~~ my own) is a classical example of the meticulously worked "research" that passes for "scientific psychology," to be duly published in Journal of Experimental Psychology, or J.V.B.V.L. where it will most probably be read by no one but the sponsor and his immediate friends, and then, only within a few months of its publication date and the award of the Ph.D.

Research on concept~~s~~ formation, on "non-reversable" and "reversable" shifts, etc., is impeccable by all conventional standards. The experiments ~~made~~ done are elegantly and correctly conceived and designed. Their final form ~~as~~ published, one may be sure, raises the hackles of no "rigorous experimentalist." It is also devoid of imagination and of direction. Each is the inevitable "next" of a series of researches that is not only narrow, but is deep only in the sense that a rut is deep. Like a rut, ~~it~~ the series provides no escape, intellectual, experimental, or observational. Like a rut, it will yield wheel-spinning, like a rut, it is an impediment on a road that might otherwise lead somewhere. The research we read produces ~~results,~~ results that are relevant only to the research antecedent to it, or presently being done by a small band of intimates of the same theoretical persuasion. It has no contribution to make to our understanding of human behavior, of thinking and conceptualizing, of education, of means for the development of 'artificial intelligence' in computer science, or of... you name the problem - and the irrelevance of ~~this~~ research on concept formation to it will be evident.

[illegible]

This irrelevance stems from the attenuated and very special concept of 'concept' that stems from reading books on logic, which ~~and from them~~ generating classifications of "concepts" suitable for logicians rather than psychologists. Whatever the logicians may be able to state about possible concepts, and however reasonable these may be in logical exposition, they resemble only slightly the concepts we encounter, acquire, and use in "real life" - in our thinking, in our education, and in our writing. Granted that a few instances of some of these may be found outside the texts and the dictionaries, they are typically described, written, and thought about in terms quite other than those we encounter in our thinking and speaking outside of studies of 'concepts'.

Concepts include 'red garbage cans without tops', concepts stated with a conjunction of words. We have in our Society people with the inclusive disjunctive concept "Eastern ∩ liberal ∩ journalists," and who then behave accordingly. We do not think of these men as other than stupid or prejudiced. They need to be investigated as aberrative paradigms. Such concepts are logically concepts but their role in behavior is something else. ~~Would it be amusing to point out "conditional Concepts" of the sort psychological researchers work on, such as "squares, if and only if red" must coincide with "Russian bureaucrat"? No, it would not;~~ The concepts we must learn and use as educated people, and that we use as members of Western Society, - "anatomy", "noun", "Louis the Fourteenth", "retina", "value-added tax", "area", "concept" (itself), ~~most~~ and so on and on are outside the scope of the meaningless abstractions of ~~this~~ most ~~for the~~ studies of concept formation. ~~proposal.~~ How do we teach children and adults the concepts they will and must think in terms of? Are all classes of concepts that set-theorists can distinguish "equal"?

Does anyone ever acquire a concept through the ordered and orderly trial-by-trial sequence of the psychology laboratory? Do the standard college sophomores coerced into serving in a patently vacuous experiment behave as do others? As do children? As do scientists? Psychologists? Unpaid volunteers? If so, like whom, and under what circumstances do they do so?

Has human thought and conceptualization remained unaffected by the peculiar invention of writing? Are concepts indeed acquired by us all as if we were illiterate? [illegible]

Where, where, where is a single instance of either a "hopelessly conservative," or of a "radically advanced and innovative" educational system, or of anything in ~~between~~ between these poles that remotely resembles, or includes the methods, materials, data, logic, or theory, of the years of research by psychologists on "concepts"?

Who has shown means whereby such methods could be incorporated? What writer, what scientist, what teacher has found or could find any way of using the sterile concept of concepts followed by psychologists in their research and books to present and explain to anybody any genuine concept?

The relationship of this stuff to human thinking, to education, and to "real life" defines the word 'irrelevant'.

Both the stimulus materials to used and the methodology, the procedures followed in these expensive, ecologically expensive (they waste paper) researches foreordain the results that are obtained. Now couched in the currently fashionable language of "information-processing", supplemented by a second inadequately thought-through language of "rule-learning", research on concepts also incorporating a narrow range of experiment-specific stimuli of contrived and overcontrolled "attributes", ~~All of this~~ ~~the whole~~ Research using these, planned done in the context of the parametric-Anova approach to experimental design, guarantees that results will be "statistically significant." They will show slow acquisition, and they will altogether distort the behaviors in acquiring concepts that occur everywhere else, even in ~~anywhere else except~~ the laboratory, but exclusive of the experiment. The "anticipated results" will be obtained, and will lead only to further "anticipated results" of the same sterility. They will generate further self-fulfilling prophesies.

Self-fulfilling prophesies? Precisely: what our textbooks of "scientific methodology" describe as "hypotheses" that are to be "verified" by experimental confirmation; the self-fulfilling prophesy is the "verified theoretical prediction." It escapes methodology merchants that "verification" is ensured in almost all cases by the choice of subjects, of apparatus, of procedures (operations) and of

Rough draft

"statistical design", and that when prediction fails the first time, one need only "improve" the conditions to push the prophesy over into the truth, and, if still unsuccessful then patiently to repeat the same idiocy through the average of twenty times before the 5% level will be hit. N.S.F. or N.I.M.H. support will ensure that such "pilot experiments" can be paid for; the proposal reviewers ~~give their jobs,~~ guided the researchers to their degrees, got them their jobs, and now support their "research."

Perhaps too strongly stated. Why make enemies if you want these people to listen...

If you put the human into a solitary experimental room, and flash stimuli at him successively, and if you deprive him of pencil and paper, and if you.... well, if you carry out the methodology of concept formation experiments, and its sisters and brothers, and its cousins and its aunts, it is guaranteed not only that the "anticipated results" will be obtained, but also that nothing else worth noting will occur, because it cannot.

No ¶ You cannot shoot pool wearing a straight jacket.

If the subjects appear to be stupid (as these kinds of research ensure), what choice had they? How does the "insight" that occurs for one subjects at one moment emerge from the averages across trials, and across subjects, where there is no one around to observe him, and when the record omits all but key-presses or the like, accumulated by an army of expensive computerized counters?[2] Experimental psychologists, regrettably, have acquired a set of concepts and methods that guarantee their success. Their capacity to develop self-fulfilling prophesies by a methodology altogether unsuited to the study of behavior is subtle, not readily observed; it has enabled them to consider themselves vastly superior to "clinicians" who, when they make self-fulfilling prophesies, are, indeed, accurately "diagnosing", and properly following through a course of "treatment" reeducation towards a goal that is not the "test of a theory," but achievement of a desired change. When clinicians pointed out that they were doing "the same thing" as "scientists", they were considered self-deluded fools.

* see Footnote, Last page.

The~~y~~ clinicians were, of course, right. The self-fulfilling prophesy reigns in psychology today, not the discovery of the unexpected, nor the honest achievement of a planned result. It is the essential and denied result in clinical psychology.

Rough draft

Rough draft

It is the self-seeking vindication of "science" in pseudo-experimental psychology. Advances in "experimental psychology" are to science, as the 522nd, 523rd, and 524th performances of "Fiddler on the Roof", or the ceremonial award of a medal by Mr. Nixon, are to news.

~~Strictly manufactured.~~ There will be no new or productive (much less imaginative) developments in psychological research so long as such old, contrived, more-of-the-same stuff as this are so generously funded as such research now is. The quarter-million dollar mountains (federal money, of course) will labor, and the mouse will duly emerge. ~~It~~ But it will be a very ordinary mouse, not even of interest to geneticists.

It ~~might be~~ is somewhat unfair to state that all classical experimental psychology of 'human learning', of 'verbal learning', and of 'concept formation' has been an altogether empty enterprise. There are, after all, ~~one or two~~ a few raisins in this soggy boiled pudding. ~~It~~ However, it is *not* harsh to state that the whole effort has led nowhere except by accident, and has yielded little systematic result other than the professional advancement of those who do it, who publish for each other, and who duly get elected to the National Academy of Science, and dream of Nobel Prizes.

Congress will catch on to this self-serving game. But one would hope ~~expects~~ that a new generation of students will get there first. After all, there is now more to experience than getting someone to learn by using a memory drum, or to fiddling with Weigl cards and the more expensive (and impressive, but equally useless) ~~useful)~~ equivalents provided by the New Psychological Technologies.

(footnote from page 1)

~~FINAL:~~ ~~P.S.~~[1] Has anybody noticed that many concepts are taught to children merely by pointing at two positive, and one negative instances of them, with a word or two of "explanation"? Our subjects are treated not merely as illiterate, but as deaf and "dumb".

~~The vacuity is barely to be borne.~~

Appendix B

Terms Specifically Introduced, and Defined, or Specifically Redefined, For Operational-Analysis

Antecedent Operations
Baseline Operations
Categoric Operations
Conditions
Conditions of the Experiment
Dependence Operations
Discriminal Operations
Implicative
Locomotion
Maintenance Operation
Operation
Opportunity-to-behave
Outcome
Probe Operations
Pre-probe Operations
Procedure
Process
Process Operations
Process-relevant Operations
Recruiting Operations
Response Operations
Response Production
Selection Operations
Setting Operations
Stator
Stimulation Operations
Transient

Appendix C

TERMINAL REPORT

SUB-CONTRACT WITH THE UNIVERSITY OF TENNESSEE

RE OE CONTRACT TO WILLIAM S. VERPLANCK

Although this is technically a terminal report as related to the present availability of supporting funds, it is actually an interim report of a continuing project aimed at summarizing the literature of learning in a concise, computer-access format organized systematically according to an operational analysis of the relevant situations. This report is essentially a listing of the progress made to date.

1. The first listing displays the traditional topic headings which have been used to code articles concerned with simple learning situations. To date, the abstracts of approximately 14,000 articles have been placed on IBM cards and coded according to one or more of the traditional topic headings. A second bibliography card has also been prepared, coded and then stored on magnetic tape. A sort and merge program has been written which enables rapid retrieval of the bibliography on any of the topics or any combination of them, and also the ready addition of new references as these become available.

2. The second listing displays the results of such a sort, giving a third deck which includes abbreviations of the title of the articles. These latter are useful especially during the early stages of analysis. For example, the present listing on "secondary reinforcement" can be scanned for articles relevant to specific issues such as secondary reinforcement based on primary negative reinforcement.

3. The third listing displays the general format in which publication could be made for use of the scientific community. It contains several components as follows:

    a. First is a narrative description of the area, defining the relevant operations to be included in the summary. Additional statements attempt to relate the area to other topics that would ultimately appear in comparable format.

    b. Next is the bibliographic listing of the relevant articles as determined from the search of the coded files. This again is the listing showing abbreviated titles and intends to provide an exhaustive yet concise presentation of the relevant literature.

    c. There follows the standard reference card and a series of statements abstracting the significant features of the experimental findings. These may be thought of as the facts as supported by available research.

d. The next listing is the critical aspect of this aspect of the project, namely the summary of the empirical evidence into a shortened list of statements intended to identify the generalizations (laws) indicated by the empirical facts. These statements are, in effect, inductions from the more specific facts in an effort to organize knowledge at a more abstract level.

e. The laws are followed by a list of references indicating the articles that are relevant to each statement.

f. Finally, there would be a listing of the theoretical statements that have been proposed as a basis for conceptual understanding of the various phenomena in the topic area.

4. The final listing is intended to illustrate the way in which a more systematic organization of the laws could be done on the basis of an operational analysis. This is a more specific analysis of the topic of aversive control and would be a supplement integrated with the more general analysis being worked on collaboratively. The critical point is that the laws given for differential conditioning were listed quite arbitrarily. The approach illustrated here identifies the variety of aversive control situations in a systematic way, and the relevant laws could readily be numbered according to the nature of the operations employed.

It should be apparent that none of the above materials is final. The most critical missing element is a general coding scheme that will be inserted onto the bibliography cards to convey information about the classes of operations to which the experiment is relevant. This coding may affect the most effective mode for presenting the facts, and a number of relevant articles have been identified but not yet abstracted and run through the format. This general code, possibly together with supplemental codes as appropriate to selected areas, would be used to organize the laws. It would appear that these objectives can be achieved in time so that at least an initial publication can enable a more general evaluation of the usefulness of this approach.

Frank A. Logan

Frank A. Logan
Sub-contractor

1 December 1970

Appendix D

DATE 12/09/77

LITERATURE OF LEARNING ... DIFFERENTIAL CONDITIONING

DIFFERENTIAL CONDITIONING REFERS TO THOSE PROCESS OPERATIONS IN WHICH THE CONDITIONS AND/OR SCHEDULES OF REINFORCING AND/OR AVERSIVE EVENTS ARE DIFFERENTIAL WITH RESPECT TO THE INTERSPERSED PRESENCE OF SOMEWHAT SIMILAR STIMULI. TWO SUCH STIMULI WILL BE REFERRED TO AS S1/S2 WHEN S1 IS ASSOCIATED WITH THE PREFERRED CONDITION OR SCHEDULE, OR S+/S- WHEN S- IS ASSOCIATED WITH NONREINF.

THE BASIC INDEPENDENT VARIABLES IN DIFFERENTIAL CONDITIONING ARE THE AMOUNT OF DIFFERENCE BETWEEN THE STIMULI AND/OR THE AMOUNT OF DIFFERENCE BETWEEN THE CONDITIONS OR SCHEDULES. THE BASIC DEPENDENT VARIABLE IS THE DEGREE OF STIMULUS CONTROL AS MEASURED BY DIFFERENTIAL RESPONDING IN THE PRESENCE OF EACH STIMULUS. INTEREST ALSO CONCERNS THE RATE AT WHICH STIMULUS CONTROL IS ACQUIRED AND THE DEGREE TO WHICH CONTROL IS TRANSFERRED TO SIMILAR STIMULI.

DIFFERENTIAL CLASSICAL CONDITIONING IS THE IRREGULAR MIX OVER TRIALS OF OPERATIONS PAIR(S1,US1) AND PAIR(S2,US2). US2 MAY BE NO-US.
DIFFERENTIAL OPERANT CONDITIONING IS THE IRREGULAR MIX OVER TIME OF OPERATIONS S1-SCHED/COND1 AND S2-SCHED/COND2. SCHED/COND2 MAY BE EXTINCTION.
DIFFERENTIAL INSTRUMENTAL CONDITIONING IS THE IRREGULAR MIX OVER DISCRETE TRIALS OF OPERATIONS S1-COND/SCHED1 AND S2-COND/SCHED2. COND/SCHED2 MAY BE NONREINFORCEMENT.

DIFFERENTIAL CONDITIONING OPERATIONS ARE HERE DISTINGUISHED FROM THOSE OF DISCRIMINATION LEARNING WHERE TWO (OR MORE) STIMULI ARE PRESENTED SIMULTANEOUSLY AND THE CONDITIONS AND/OR SCHEDULES OF REINFORCING AND/OR AVERSIVE EVENTS DEPEND UPON WHICH STIMULUS IS SELECTED BY THE ORGANISM. DIFFERENTIAL OPERANT/INSTRUMENTAL CONDITIONING OPERATIONS MAY BE INTERSPERSED WITH DISCRIMINATION LEARNING OPERATIONS. (CLASSICAL DISCRIMINATION LEARNING IS AN IMPOSSIBLE OPERATION.)

DIFFERENTIAL CONDITIONING OPERATIONS ARE HERE DISTINGUISHED FROM THOSE OF DIFFERENTIATION LEARNING WHERE TWO (OR MORE) RESPONSES ARE SIMULTANEOUSLY AVAILABLE TO THE ORGANISM AND THE CONDITIONS OR SCHEDULES OF REINFORCING OR AVERSIVE EVENTS DEPEND UPON WHICH RESPONSE IS SELECTED. DIFFERENTIAL OPERANT/INSTRUMENTAL CONDITIONING OPERATIONS MAY BE MIXED WITH DIFFERENTIATION LEARNING OPERATIONS AND THEORIES OF DIFFERENTIAL CONDITIONING MAY BE APPLIED TO OPERATIONS OF DIFFERENTIATION LEARNING. IN THE LATTER CASE, IT IS ASSUMED THAT DIFFERENTIATION LEARNING IS A SPECIAL CASE OF DISCRIMINATION LEARNING BASED ON INTEROCEPTIVE FEEDBACK STIMULI.

DIFFERENTIAL CONDITIONING MAY BE CONSIDERED THE MOST BASIC OR FUNDAMENTAL LEARNING PROCESS. CONSIDER AN ORGANISM IN AN ENVIRONMENT IN WHICH EMOTIONALLY-POSITIVE AND/OR NEGATIVE EVENTS OCCASIONALLY OCCUR OR WOULD OCCUR IF A REQUISITE RESPONSE WERE MADE. WERE NO OTHER EVENTS INVOLVED, SUCH AN ENVIRONMENT WOULD BE ONE OF MAXIMUM UNCERTAINTY DEPENDING ON THE FREQUENCY OF SUCH EVENTS. HOWEVER, IF SOME STIMULUS SCHEDULE IS CORRELATED WITH THE SCHEDULE OF EMOTIONALLY-SIGNIFICANT EVENTS, THEN THE ORGANISM'S UNCERTAINTY ABOUT THE ENVIRONMENT COULD BE REDUCED BY RESPONDING IN ACCORD WITH THE INFORMATION CONVEYED BY THE CORRELATED STIMULUS SCHEDULE. THE AMOUNT OF ENTROPY INHERENT IN THE ENVIRONMENT DEPENDS ON THE DEGREE OF CORRELATION BETWEEN THE SCHEDULES.

THIS VIEW APPLIES DIRECTLY TO THE SIMPLE FORMS OF CLASSICAL, OPERANT AND INSTRUMENTAL CONDITIONING. FOR EXAMPLE, THE CS IN CLASSICAL CONDITIONING CONVEYS INFORMATION ABOUT THE IMPENDING OCCUPRENCE OF THE US. TEMPORAL CUES CONVEY SOME INFORMATION ABOUT THE AVAILABILITY OF REWARD IN OPERANT FIXED-INTERVAL SCHEDULES AND THE ENABLING EVENT CONVEYS INFORMATION ABOUT THE OPPORTUNITY FOR REWARD IN INSTRUMENTAL CONDITIONING. ALTHOUGH DIFFERENTIAL CONDITIONING COULD THUS BE VIEWED AS SUBSUMING ALL SIMPLE LEARNING SITUATIONS, THE LITERATURE INCLUDED IN THIS SUMMARY IS RESTRICTED TO A SPECIAL CLASS OF OPERATIONS.

SPECIFICALLY, THE INTER-TRIAL OR TIME-OUT OPERATIONS ARE NOT TREATED AS EXPLICIT DISCRIMINATIVE STIMULI AND THERE MUST BE AT LEAST TWO EXTEROCEPTIVE STIMULUS EVENTS THE SCHEDULES FOR WHICH HAVE SOME DEGREE OF CORRELATION WITH EMOTIONALLY-SIGNIFICANT EVENTS. THUS, THERE MUST BE AT LEAST TWO EXPLICIT CS IN CLASSICAL CONDITIONING, THERE MUST BE AT LEAST TWO EXPLICIT DISCRIMINATIVE STIMULI IN OPERANT CONDITIONING AND THERE MUST BE AT LEAST TWO DISTINCTIVE STIMULI IN THE PRESENCE OF WHICH THE RESPONSE IS ENABLED IN INSTRUMENTAL CONDITIONING.

DIFFERENTIAL CONDITIONING INTERSECTS WITH MANY OTHER TRADITIONAL TOPICS IN THE PSYCHOLOGY OF LEARNING. FOR EXAMPLE, CONSIDER THE PROCEDURE IN WHICH S+ OCCURS MOST OF THE TIME WITH ONLY OCCASIONAL PRESENTATIONS OF S-. THESE LATTER THEN TAKE ON THE CHARACTER OF PROBE OPERATIONS FOR STIMULUS GENERALIZATION. CONSIDER THE PROCEDURE IN WHICH S+ AND S- ARE VERY SIMILAR OR EVEN IDENTICAL. THIS LATTER BECOMES THE FAMILIAR PARTIAL REINFORCEMENT PROCEDURE. STIMULI DIFFERENTIALLY ASSOCIATED WITH REINFORCING EVENTS THEMSELVES ACQUIRE REINFORCING PROPERTIES. HENCE, THE DIFFERENTIAL CONDTIONING OPERATIONS SHOULD LEAD TO CONDITIONED OR SECONDARY REINFORCEMENT. WHEN A STIMULUS IS CORRELATED WITH AN AVERSIVE CONSEQUENCE, THE PUNISHMENT PARADIGM IS INVOLVED. FURTHERMORE, THERE ARE MANY PROCEDURES THAT HAVE NOT RECEIVED EXTENSIVE STUDY, SUCH AS DIFFERENTIAL AVOIDANCE CONDITIONING, DIFFERENTIAL OMISSION TRAINING AND DIFFERENTIAL ESCAPE LEARNING.

FINALLY, IT SHOULD BE NOTED THAT THE DIFFERENTIAL CONDITIONING OPERATIONS ARE RELEVANT TO A NUMBER OF THEORETICAL ISSUES. PERHAPS MOST OBVIOUS IS THE NATURE OF THE STIMULUS FOR LEARNING. IF ONE ADOPTS THE RELATIONAL VIEW THAT THE CONTROLLING PROPERTY OF A STIMULUS IS NOT ITS ABSOLUTE VALUE BUT RATHER ITS VALUE RELATIVE TO OTHER STIMULI IN THE ENVIRONMENT, THEN THE SIMPLE FACT OF DIFFERENTIAL CONDITIONING APPEARS TO BE EMBARRASSING. TO HANDLE SUCH A RESULT, THE THEORIST MUST POSIT PERSEVERATING TRACES OF PRECEDING STIMULI TO WHCIH ANY PRESENT STIMULUS IS COMPARED. OTHER QUESTIONS SUCH AS WHICH ELEMENTS OF A COMPOUND STIMULUS GAIN CONTROL OVER BEHAVIOR HAVE BEEN MOST EFFECTIVELY STUDIED IN THE CONTEXT OF DIFFERENTIAL CONDITIONING.

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                                                                      DATE 12/09/70

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JCPP69-68/558 MCENANEY,K.W.BUTTER       PERSEVERATION OF R WITH ORBITAL ABLATIONS
PS   66- 6/485 MCHOSE,J.H.LUDVIGSON     DIFF COND WITH NONDIFF REINF
JEP 69-81/256 MCHOSE,J.H.               FRUSTRATION IN S-DISCRIM CONTRAST.
JCPP69-67/390 MELLGREN,R.L.OST          TRANSFER PAVLOVIAN TO OPERANT DISCRIM
PS   67- 9/139 MEREDITH,A.L.SCHNEIDERMANCLASS DISCRIM COND WITH DELAY AND TRACE.
JCPP69-68/249 MILES,C.G.ETAL            STIM CONTROL BY IRRELEVANT FEATURE
JEAB69-12/293 MILLER,L.                 COMPOUNDING OF PRE AVERSIVE STIMULI
JEP 64-68/250 MOORE,J.W.                DIFF EYELID COND AS-F FREQ/INTENSITY CS
JEP 69-81/469 MOYER,M.J.ROSS            STIM COMPLEXITY AND ISI IN DIFF COND.
JEAB68-11/ 77 NATHAN,M.A.SMITH          DIFFERENTIAL COND EMOTIONAL RESPONSES.
JEAB66- 9/305 NEVIN,J.A.SHETTLEWORTH    CONTRAST EFFECTS IN MULT SCHED
JEAB68-11/715 NEVIN,J.A.                DIFF SR AND STIM CONTROL OF NOT-RESP.
JEP 69-80/146 NEWMAN,F.L.WOODHOUSE      DIFF RESP BEFORE VARY PROB SR.
JCPP62-55/550 NORTH,A.J.                DISCRIM REVERSAL LRNG IN RUNWAY
JEAB68-11/537 O'BRIEN,F.                DEQUENTIAL CONTRAST EFFECTS IN HUMANS.
PS   66- 5/ 25 OVERMIER,J.B.            DIFF TRANSFER AVOID R AS-F US DURATION
JCPP69-68/364 PARE,W.P.                 AGE AND SHOCK INTENSITY ON DISCRIM CER
JEP 67-73/187 PECKHAM,R.AMSEL           FRUSTRATION AND MAG SR IN DIFF COND.
JEP 67-74/219 PENNES,E.S.ISON           DISCRIM LRNG/REVERSAL/EXTINCTION AS-F PR
JEP 59-57/181 PERKINS,C.C.ETAL          DIFFICULTY OF DISCRIM AND GEN
JEP 68-77/393 PLATT,J.R.GAY             DIFF COND AS-F PRE DIFF SR MAG.
JEP 69-82/ 38 PLATT,J.R.ETAL            DISCRIM, CONTRAST AND CHAINING.
JEAB68-11/271 PLISKOFF,S.S.ETAL         R RATES AND SR RATES IN ANULT SCHEDULE.
PRP 64-15/279 PORTER,J.J.               DIFF SR MAG ON DISCRIM W/FREE-FORCE TRIAL
PS   68-12/ 58 PROKASY,W.F.ETAL         SEQUENTIAL EFFECTS IN DIFF COND.
JEP 69-80/271 PROKASY,W.F.ALLEN         INSTRUCTIONS AND HUMAN DIFF COND.
JEP 55-49/423 REINHOLD,D.B.PERKINS      S GEN AFTER DIFF METHODS OF TRNG
JEAB61- 4/107 REYNOLDS,G.S.             INTERACTIONS IN MULT SCHED
JEAB61- 4/179 REYNOLDS,G.S.             RELATIVITY OF R RATE AND SR FREQ
JEAB68-11/453 REYNOLDS,G.S.             INDUCTION, CONTRAST, AND REXT.
JEAB68-11/543 REYNOLDS,G.S.LIMPO        SOME CAUSES OF BEHAVIORAL CONTRAST.
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JEAB69-12/911	REYNOLDS,G.S.LIMPO	ATTENTION AND GEN DURING COND DISCRIM
JEP 69-82/148	RICKERT,E.J.	FEEDBACK IN DISCRIM AND DIFF.
JEAB68-11/129	RILLING,M.	TIME OUT ON DISCRIM BETWEEN FR SCHEDULES.
JEAB69-12/917	RILLING,M.ETAL	AVERSIVE PROPERTIES OF S- IN DISCRIM
PS 67- 9/333	ROSS,L.E.ETAL	DIFF EYELID COND WITH MASKING TASK
JEP 58-55/ 51	RUNQUIST,W.N.	DIFF COND AND INTENSITY OF US
PRP 62-11/ 43	RUNQUIST,W.N.ETAL	CLASSICAL/AVOID DIFF EYELID COND
JEAB69-12/933	SADOWSKY,S.	DISCRIM R ON MIXED AND MULTIPLE SCHEDULES
JEAB69-12/951	SAUNDERS,J.C.	DISCRIM OF CLICK INTENSITY
JCPP69-67/212	SCGYCJNAB,H.ETAL	OLFACTORY DISCRIM WITH LESIONS
JEAB68-11/571	SCHMITT,D.R.MARWELL	STIM CONTROL IN COOPERATION.
JEAB68-11/777	SCHUSTER,R.RACHLIN	INDIFF BETWEEN PUNISHMENT AND FREE SHOCK
JCPP67-64/121	SENF.G.M.MILLER	POSITIVE INDUCTION IN DISCRIM LEARNING
JEAB69-12/767	SERAFANIAN,P.VOM SAAL	BLOCKING DEVEL OF STIM CONTROL
JEAB68-11/689	SHERMAN,J.A.THOMAS	PREFERENCE BETWEEN FR AND VR SCHEDULES.
JEAB65- 8/199	SHETTLEWORTH,S.NEVIN	RELATIVE R RATE AND RELATIVE SR MAGNITUDE
JEAB69-12/403	SHIMP,C.P.	CONCURRENT SR OF TWO INTERESPONSE TIMES
JCPP69-67/ 64	SHUMAKE,S.A.ETAL	OLFACTORY DIFFERENCE THRESHOLDS
JEP 65-70/510	SPEAR,N.E.HILL	SIMULT AND SUCCESSIVE CONTRAST
PM 66-80/ 10	SPEAR,N.E.PAVLIK	SIMULT AND SUCCESSIVE CONTRAST EFFECTS
JCPP69-68/427	SPEAR,N.E.SPITZNER	TRAINING AND SR MAG ON CONTRAST AND EXT
JEP 54-48/399	SPENCE,K.W.BEECROFT	DIFF COND AND LEVEL OF ANXIETY
JEP 54-47/127	SPENCE,K.W.FARBER	RELATION ANXIETY TO DIFF EYELID COND
JEP 59-58/ 8	SPENCE,K.W.ETAL	DIFF COND AND DISCRIM F(HUNGER R FREQ)
JEP 63-65/ 35	SPENCE,K.W.TANDLER	DIFF EYELID COND AS-F US WITH D EQUATED
JEAB69-12/583	STADDON,J.E.R.	MULTIPLE FIXED-INTERVAL SCHEDULES
JEAB68-11/223	STUBBS,A.	DISCRIM OF STIM DURATION.
JCPP69-67/160	SUTHERLAND,N.S.	SHAPE DISCRIM IN RAT,OCTOPUS,AND GOLDFISH
JEP 66-72/661	SWITALSKI,R.W.ETAL	INTERDIMENSIONAL TRNG ON S GEN
JEAB68-11/ 29	TERMAN.M.KLING	DISCRIM OF BRIGHTNESS DIFF.
JEAB66- 9/613	TERRACE,H.S.	EXTENDED TRNG ON CONTRAST/PEAK SHIFT
JEAB68-11/727	TERRACE,H.S.	DISC LRNG. PEAK SHIFT, BEH CONTRAST.
JEAB69-12/571	TERRACE,H.S.	EXT AFTER DISCRIM WITH/WITHOUT ERRORS
JEAB69-12/105	THOMAS,D.R.ETAL	STIM GEN F(DELAY BEFORE TESTING)
JEAB68-11/199	TIGHE,T.J.ETAL	SUCCESSIVE REVERSALS OF CLASS DISCRIM.
PS 66- 4/247	TRAPOLD,M.A.	REVERSAL OPERANT DISCRIM
JEP 68-76/568	TRAPOLD,M.A.ETAL	TRANSFER DIFF CLASSICAL - DIFF INSTR COND
JEAB68-11/147	TULLIS,C.WALTERS	PUNISHED AND UNPUNISHED R IN MULT VI SCHE
PMS 64-19/927	UHL,C.N.	OVERTRAINING ON REVERSAL AND NONREVERSAL
PMS 67-24/ 75	UHL,C.N.ETAL	OVERTRAINING ON REVERSAL AND NONREVERSAL
JEAB68-11/753	VETTER,E.H.HEARST	GEN AND DISCRIM OF SHAPE ORIENTATION.
JEP 42-31/312	WALKER,K.C.	TRANSFER DISCRIM S TO UNASSOCIATED R
PS 64- 1/193	WALL,A.M.GOODRICH	DIFF R ON REINF AND NONREINF TRIALS
JCPP65-60/ 70	WALL,A.M.	DISCRETE-TRAILS ANALYSIS OF FI DISCRIM
JGNP56-89/ 61	WARREN,J.M.BARON	SUCCESSIVE AND SIMULT DISCRIM BY CATS
JEAB61- 4/365	WEISSMAN,A.	DISCRIM S CORRELATED WITH SR CONTINGENCY
JEAB68-11/767	WEISS,K.M.	COND SUPPRESSION AND OPERANT DISCRIM.
JEAB69-12/443	WEISMAN,R.E.	DETERMINANTS OF INHIBITORY STIM CONTROL
JEAB69-12/229	WEISMAN,R.E.PALMER	DISCRIM TRAINING AND PRIOR NON-DIFF SR
JEP 69-82/272	WILCOX,J.M.ROSS	DIFF CLASS COND AS-F CS INTENSITY,ISI.
JCPP69-68/118	WILLIAMS,J.L.	PUNISHMENT...CHANGES IN AUTONOMIC RESP
JCPP67-63/ 87	WILSON,R.S.DUERFELDT	CARDIAC RESPONSIVENESS AND DIFF COND
JEAB69-12/239	WILTON,R.N.GAY	BEHAVIORAL CONTRAST AS SR CONDITIONS
JEAB69-12/905	WILTON,R.N.GAY	BEHAVIOR CONTRAST IN CHAINED SHEDULES

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  JEAB68-11/415 YARCZOWER,M.ETAL           DISCRIM TRNG WITH EQUATED FREQ OF SR.
  JEAB69-12/563 YARCZOWER,M.SWITALSKI      STIM CONTROL AFTER MASSED EXTINCTION
 -JEP 68-77/468 YEHLE.A.L.                 THREE-TONE CLASS DISCRIM COND.


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AMELLK65              PS  65- 3/311 AMES,L.L.YARCZOWER
AMELLK65  01  DIFF VI/NR RE C1/C2 PRODUCE DIFF OR RATE.                         FSH
AMELLK65  02  ABOVE-1 RATE TO S+ GREATER THAN IF VI TO S1 ONLY.
AMELLK65  03  AFTER ABOVE-1, MAX RATE TO S DISPLACED FROM S-.
AMELLK65  04  ABOVE-2/3 REVERSIBLE BY VI TO S1 ONLY.

APPJBK62              JCPP62-55/ 37 APPEL,J.B.HISS
APPJBK62  01  DIFF FI/FREL SR ON SAME FI RE S1/S2 PRODUCE DIFF OR RATE.         RAT
APPJBK62  02  RELATIVE RATE DURING INTERVAL SAME IN S1/S2.

BERJWK67              JEAB67-10/243 BERNHEIN,J.W.WILLIAMS
BERJWL67  01  DIFF VR/VR RE S1/S2 PRODUCE DIFF WHEEL RUN OR.                    RAT
BERJWL67  02  WHEN SHIFT FROM S1 TO S2, RAPID DECREASE IN OR.
BERJWL67  03  ABOVE-2 FOLLOWED BY GRADUAL INCREASE IN OR.
BERJWL67  04  ABOVE-2 GREATER DECREASE THE LONGER THE DURATION OF S1.
BERJWL67  05  SOME EVIDENCE OF INCREASE IN OR WHEN SHIFT FROM S2 TO S1.

BERRNB43              JEP 43-32/325 BERRY,R.N.ETAL
BERRNC43  01  DIFF SR/NR RE B/W PRODUCE DIFF IR SPEED.                          RAT
BERRNC43  02  REVERSE ABOVE-1 PRODUCE REVERSAL IN IR SPEED.
BERRNC43  03  REVERSA ABOVE-2 PRODUCE REVERSAL IN IR SPEED.
BERRNC43  04  DIFF IR SPEED DEC-F NUMBER OF REVERSALS.

BIRDXB60              JEP 60-60/ 36 BIRCH,D.ETAL
BIRDXC60  01  DIFF SR/NR RE W/B PRODUCE DIFF IR APPROACH SPEED RE W/B.          RAT
BIRDXC60  02  REVERSE SR/NR RE W/B PRODUCE REVERSE IR SPEED RE W/B.
BIRDXC60  03  RATE OF 2 ABOVE FASTER IF  OVERTRAIN BEYOND CRITERION.
BIRDXC60  04  ABOVE 3 RESULT FROM FASTER EXTINCTION OLD S+, NO DIFF NEW S+.

BIRDXB63              JEP 63-65/148 BIRCH,D.ETAL
BIRDXC63  -1  DIFF SR/NR RE W/B OR W/G PRODUCE DIFF IR SPEED RE W/B OR W/G.  RAT
BIRDXC63  -2  ABOVE 1 GREATER FOR W/B THAN FOR W/G AFTER EQUAL TRIALS.
BIRDXC63  -3  RATE OF EXTINCTION TO WHITE (OLD S+) EQUAL CONT REINF CONTROL.
BIRDXC63  -4  RATE OF EXTINCTION TO WHITE FASTER THAN PARTIAL REINF CONTROL.
BIRDXC63  -5  REPLICATE ABOVE 3 AND 4.

BLOTM266              JEAB66- 9/155 BLOOMFIELD,T.M.
BLOTM366  -1  DIFF VI 1 MIN/EXT RE LINE TILT S1/S2 PRODUCE DIFF RATE OR.       PGN
BLOTM366  -2  IF R IN S- PROLONG S-, RATE IN S+ INC-F RATE IN S- EARLY IN TRNG.
BLOTM366  -3  IF R IN S- PROLONG S-, RATE IN S+ NOT-F RATE IN S- LATE IN TRNG.
BLOTM366  -4  ABOVE-3 RATE IN S+ GREATER THAN VI BASELINE RATE.
BLOTM366  -5  WITH FIXED DURATION S-, RATE IN S+ NOT-F RATE IN S-.
BLOTM366  -6  ABOVE-5 RATE IN S+ GREATER THAN VI BASELINE RATE.

BLOTM267              JEAB67-10/151 BLOOMFIELD,T.M.
BLOTM267  -1  DIFF VI/DRL AND VI/FR RE S1/S2 PRODUCE DIFF OR RATE.              PGN
BLOTM267  -2  OR RATE IN S1 DEC-F RATE OF SR IN S2 ON DRL OR FR.
BLOTM267  03  SR RATE IN DRL LOWER WHEN MIX WITH VI IN S1 THAN DRL ALONE.
BLOTM367  -4  OR RATE IN FR DEC-F FR REQUIREMENT.
BLOTM267  -5  ABOVE-4 STEEPER WHEN MIX WITH VI IN S1 THAN FR ALONE.
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BLODS269            JEAB69-12/ 91 BLOUGH.D.S.
BLODS269   -1  EQUAL SR/SR RE S1/S2 PRODUCE SUMMATED GENERALIZATION GRADIENT. PGN

BOARA269            JEAB69-12/201 BOAKES.R.A.
BOARA269   -1  DIFF SR OF R1/R2 RE S1/S2 PRODUCE CHOICE R1/R2 RE S1/S2.        PGN
BOARA269   -2  CHOICE R1 OGIVAL DEC-F S FROM S1 TO S2.

BOWJXK66            PS  66- 5/297 BOWEN.J.STRICKERT
BOWJXL66   -1  DIFF SR/NR RE PRIOR SR/NR AND ITI PRODUCE DIFF IR RUN SPEED.   RAT
BOWJXL66   -2  DIFF IR SPEED RE PRIOR SR/NR LARGE WITH 15 SEC ITI.
BOWJXL66   -3  DIFF IR SPEED RE PRIOR NR/SR SMALL WITH 5 MIN ITI.
BOWJXL66   -4  NOTE ABOVE 2/3 CONDITIONAL DISCRIMINATION WITHIN GROUP.
BOWJXL66   -5  IR SPEED FASTER AT 5 MIN ITI THAN AT 15 SEC ITI.

BOWGH261            JEP 61-62/196 BOWER.G.H.
BOWGH361   -1  DIFF SR/SR RE W/B PRODUCE DIFF IN RUN SPEED RE W/B.            RAT
BOWGH361   -2  SPEED LARGER SR ABOVE 1 EQUAL CONT LARGE SR CONTROL.
BOWGH361   -3  SPEED SMALLER SR ABOVE 1 SLOWER THAN CONT SMALL SR CONTROL.

BOWGHK59            JCPP59-52/727 BOWER.G.H.TRAPOLD
BOWGHL59   -1  DIFF SR/NR RE B/W GB PRODUCE DIFF IR SPEED AFTER SEE GB CUE.   RAT
BOWGHL59   -2  GB SPEED TO WHITE S+ INC-F AMOUNT OF REWARD.
BOWGHL59   -3  GB SPEED TO BLACK S- NOT-F AMOUNT OF REWARD TO S+.
BOWGHL59   -4  SHIFT TO ALL TRIALS TO WHITE S+ PRODUCE INC IN APPROACH SPEED.

CAPEJK63            PRP 63-13/ 85 CAPALDI.E.J.COGAN
CAPEJL63   -1  ALTERNATE LARGE/SMALL SR PRODUCE DIFF IR RUN SPEED.            RAT

CERLEB68            JVLB68- 7/847 CEREWICKI.L.F.ETAL
CERLEC68   -1  DIFF US/NS RE WORD CUE PRODUCE DIFF EYELID CR RE WORD CUE.     MAN
CERLEC68   -2  ABOVE 1 DEC-F NO. UNRELATED WORDS IN S+ AND S- STIMULUS SETS.
CERLEC68   -3  ABOVE 1 DEC-F NO. RELATED WORDS IN S+ AND S- SETS. INVOLUNTARY CR.
CERLEC68   -4  ABOVE 1 NOT-F NO. RELATED WORDS IN S+ AND S- SETS. VOLUNTARY CR.

CHARAK62            AUJP62-14/ 27 CHAMPION.R.A.SMITH
CHARAL62   -1  DIFF SR/NR RE W/B SB PRODUCE DIFF IR RUN SPEED TO GREY GB.     RAT

CHARAK66            JEP 66-71/529 CHAMPION.R.A.SMITH
CHARAL66   -1  DIFF SR/SR RE W/B PRODUCE DIFF IR RUN SPEED RE W/B.            RAT
CHARAL66   -2  MIX ABOVE 1 WITH CHOICE W/B PRODUCE SOME PREFERENCE FOR S+.

CHOHXK62            ABE 62-22/ 11 CHORAZYNA.H.KONORSKI          1
CHOHXL62   -1  DIFF US/NS RE TONE FREQ PRODUCE DIFF SALIVARY CR RE TONE FREQ. DOG
CHOHXL62   -2  ABOVE 1 DIFFICULT IF CHANGE TONE FREQ DAILY. HIGHER FREQ ALWAYS S+

CLAFLK61            JEAB61- 4/295 CLAYTON.F.L.STEVENSON
CLAFLK61   01  DIFF VI/VI RE S1/S2 PRODUCE DIFF OR RATE.                      RAT
CLAFLK61   02  RATIO OF RATE RE S1/S2 INCREASED DURING EXTINCTION IN BOTH SUOS2.

COLLEB42            JGNP42-26/ 35 COLE.L.E.ETAL
COLLEC42   -1  DIFF US/NS RE L1/L2 PRODUCE DIFF EYELID CR RE L1/L2.           MAN
COLLEC42   -2  ABOVE-1 INC-F ITI. WITH SIMPLE ALTERNATION CS+/CS-.
COLLEC42   -3  ABOVE-1 IRREGULAR ORDER OF CS+/CS- PRODUCE POORER DIFF CR.
COLLEC42   -4  ABOVE-1 GREATER CR WHEN CS- FOLLOW CS+.
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DARDX266            JEAB66- 9/327 DEARMOND,D.
DARDX266  01  DIFF FR-SN/FR-SN SN FOR FIRST OR EVERY R RE S1/S2 PROD DIFF OR PG

DICJEK63            JCPP63-  /829 DICKSON,J.F.THOMAS
DICJEK63  01  DIFF VI/VI SR DURATION RE S1/S2 PRODUCE DIFF OR RATE.          PG
DICJEK63  02  ABOVE-1 GREATER THE LARGER DIFF IN SR DURATION.
DICJEK63  03  AFTER ABOVE-1, MAX R TO DISPLACED FROM S-.
DICJEK63  04  AFTER ABOVE-1, MIN R TO S DISPLACED FROM S+.
DICJEK63  05  ABOVE 3/4 INC-F INITIAL DIFF IN SR DURATION.

EDWDC266            PRP 66-18/343 EDWARDS,D.C.
EDWDC366  -1  DIFF SR/NR RE B/W PRODUCE DIFF IR RUN SPEED RE B/W.            RA
EDWDC366  -2  RATE OF ABOVE 1 DEC/F AMOUNT PRETRAIN WITH REVERSE SR/NR RE W/B.

ELLGD264            JCPP64-57/373 ELLISON,G.D.
ELLGD364  -1  DIFF US/NS RE 8 SEC TRACE T1/T2 PRODUCE DIFF SALIVARY CR.      DO
ELLGD364  -2  DIFF US/NS RE 8 SEC DELAY T1/T2 PRODUCE DIFF SALIVARY CR.
ELLGD364  -3  ABOVE-2 DIFF CR EQUAL ABOVE-1.
ELLGD364  -4  ABOVE-1 RE 16 SEC TRACE T1/T2 PRODUCE WEAK DIFF CR

FLERAB68            JEP 68-77/286 FLEMING,R.A.ETAL
FLERAC68  -1  DIFF US/NS RE TRUE STMT+/FALSE STMT- PRODUCE DIFF EYELID CR.   MA
FLERAC68  -2  ABOVE-1 DIFF CR INC-F TRUTH OF STMT, WITHIN/BETWEEN S.
FLERAC68  -3  ABOVE-1 NO TRANSFER TO ACTUAL WORDS-TRUE AND FALSE.

GOLHXK63            JEP 63-  / 86 GOLDSTEIN,H.SPENCE
GOLHXL63  -1  DIFF SR/NR AND SR/SR RE W/B PRODUCE DIFF IR RUN SPEED RE W/B.  RA
GOLHXL63  -2  RATE OF ABOVE 1 INC/F DIFFERENTIAL IN SR.
GOLHXL63  -3  IR RUN SPEED INC-F AMOUNT OF REWARD IN THAT ALLEY.
GOLHXL63  -4  ABOVE 3 NOT-F AMOUNT OF REWARD IN OTHER ALLEY.

GOOKP265            PS  65- 3/213 GOODRICH,K.P.
GOOKP265  01  DIFF VI/VI CONC SUCROSE RE S1/S2 PRODUCE DIFF OR RATE.         RA

GRAFK243            JEP 43-33/351 GRAHAM,F.K.                 7
GRAFK243  01  DIFF SR/NR RE BUZZ/NO-BUZZ PRODUCE DIFF BAR PRESS .            RA
GRAFK243  02  DIFF SR/NR RE BUZZ/NO-BUZZ PRODUCE DIFF ALLEY RUN.
GRAFK243  03  ABOVE-1 POS TRANSFER TO ABOVE-2, VICE VERSA.

GUTNX259            JEP 59-58/335 GUTTMAN,N.
GUTNX259  01  DIFF VI/VI RE S1/S2 PRODUCE DIFF OR RATE.                      PG
GUTNX259  02  AFTER ABOVE-1, MAX RATE TO S DISPLACED AWAY FROM S-.

HANHM257            SC  57-12/888 HANSON,H.M.
HANHM257  01  DIFF VI/NR RE S1/S2 PRODUCE DIFF OR RATE.                      PG

HANHM259            JEP 59-58/321 HANSON,H.M.
HANHM259  01  DIFF SR/SN RE S1/S2 PRODUCE DIFF OR RATE.                      PG
HANHM259  02  TIME TO CRITERION DEC-F S1/S2 DIFFERENCE.
HANHM259  03  AFTER ABOVE-1, MAX RATE TO S DISPLACED AWAY FROM S-.

HANHM261            JCPP61-54/181 HANSON,H.M.
HANHM261  01  DIFF NR-VR-NR RE S1/S2/S3 PRODUCE DIFF OR RATE.                PG
HANHM261  02  AFTER ABOVE-1, STIM GEN TO S ONLY BETWEEN S1 AND S3.
HANHM261  03  ABOVE-1 PRODUCE HIGHER RATE TO S2 THAN VI IN S2 ONLY.
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HARJHK66             PS  66- 6/329 HARRIS,J.H.THOMAS
HARJHL66   -1   ALTERNATE SR/NR PRODUCE DIFF IR RUN SPEED.                        RAT
HARJHL66   -2   ABOVE 1 OBTAINED WITHOUT HANDLING BETWEEN TRIALS.
HARJHL66   -3   ABOVE 1 OBTAINED WITH SR DELIVERED AFTER RUN COMPLETE.

HENKX266             JEP 66-72/704 HENDERSON,K.
HENKX366   -1   DIFF PR(SR) RE B/W PRODUCE DIFF IR RUN SPEED RE B/W.              RAT
HENKX366   -2   IR RUN SPEED LARGE, NEG ACCEL INC-F PR(SR) IN THAT ALLEY.
HENKX366   -3   IR RUN SPEED CONT REINF ALLEY SMALL INC-F PR(SR) IN OTHER ALLEY.
HENKX366   -4   EXT CONT REINF ALLEY DEC-F PR(SR) OTHER ALLEY NOW CONT REINF.

HERRMB59             JCPP59-52/359 HERRICK,R.M.ETAL
HERRMB59   01   DIFF VI/EXT RE S1/S2 PRODUCE DIFF OR RATE.                        RAT
HERRMB59   02   RATE TO S+ INCREASES AS RATE TO S- DECREASES.

HILERB51             JEP 51-42/94 HILGARD,E.R.ETAL
HILERC51   -1   DIFF US/NS RE L1/L2 PRODUCE DIFF EYELID CR RE L1/L2.              MAN
HILERC51   -2   ABOVE-1 DEC-F ANXIETY OF SUBJECT AS MEASURED BY MMPI.

HONWK266             JEAB66- 9/377 HONIG,W.K.
HONWK266   01   DIFF SR/SR-SN RE S1/S2 PRODUCE DIFF OR SUPPRESSION.               PGN
HONWK266   02   AFTER ABOVE-1, STIM GENERALIZATION GRADIENT FROM S2.
HONWK266   03   GRADIENT FLAT IF ONLY PUNISH S2.

ISOJRK67             PS  67- 7/161 ISON,J.R.CLAIBORN
ISOJRL67   -1   IR RUN SPEED TO S- FASTER IF FOOD CUP PRESENT IN GB.              RAT

KAMACK66             PS  66- 4/325 KAMIL,A.C.DAVENPORT
KAMACK66   01   DIFF SR/NR RE S1/S2 PRODUCE DIFF OR RATE.                         RAT
KAMACK66   02   ABOVE-1 TRUE IF ALTERNATIE S1/S2 EVERY 20 SEC.
KAMACK66   03   ABOVE-1 NOT TRUE IF ALTERNATIE S1/S2 EVERY 5 OR 10 SEC.

KELRT257             PRP 57- 3/485 KELLEHER,R.T.
KELRT257   01   DIFF FI/FR COND SR RE S1/S2 PRODUCE DIFF OR RATE.                 CMP

KIMHDK64             PS  64- 1/227 KIMMEL,H.D.HARRELL
KIMHDL64   -1   DIFF US/NS RE VIBRATORY+/VISUAL- CS PRODUCE DIFF CR.              PLA
KIMHDL64   -2   DIFF US/NS RE VISUAL+/VIBRATORY- CS NOT PRODUCE DIFF CR.
KIMHDL64   -3   ABOVE-2 PRODUCE INC CR TO BOTH S+ AND S-.

LEVCMB64             JEP64-67/ 80 LEVY,C.M.ETAL
LEVCMC64   -1   DIFF US/NS RE L1/L2 PRODUCE DIFF EYELID CR RE L1/L2.              MAN
LEVCMC64   -2   REVERSE ABOVE-1 PRODUCE REVERSE DIFF COND.
LEVCMC64   -3   ABOVE-2 DEC CR TO OLD S+ GREATER THAN INC CR TO OLD S-.
LEVCMC64   -4   ABOVE-2 NOT AS RAPID AS VERBAL CS.

LUDHW266             PS  66- 4/391 LUDVIGSON,H.W.
LUDHW366   -1   DIFF PR(SR) RE W/B PRODUCE DIFF IR SPEED RE W/B.                  RAT
LUDHW366   -2   IR START SPEED FASTER IN PARTIAL THAN CONT REINF ALLEY.
LUDHW366   -3   IR RUN SPEED FASTER IN PARTIAL THAN CONT REINF ALLEY.
LUDHW366   -4   IR GOAL SPEED SLOWER IN PARTIAL THAN CONT REINF ALLEY.
LUDHW366   -5   ABOVE 2,3,4 AFTER EXTENSIVE TRAINING WITH LARGE REWARD.
LUDHW366   -6   ABOVE 2,3,4 WITH NUMBER REINF EQUATED IN TWO ALLEYS.
LUDHW366   -7   DIFF PR(SR) RE W/B PRODUCE LITTLE EFFECT ON SUBSEQUENT CHOICE.
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LUDHWK66            PS  66- 5/289 LUDVIGSON.H.W.GAY
LUDHWL66   -1  DIFF SR/SR RE W/B PRODUCE DIFF IR SPEED RE W/B.                   RAT
LUDHWL66   -2  ABOVE 1 GREATEST IN START AND RUN SEGMENTS OF ALLEYS.
LUDHWL66   -3  SPEED IN LARGE REWARD ALLEY NOT-F AMOUNT OF REWARD IN THAT ALLEY.
LUDHWL66   -4  SPEED IN SMALL REWARD ALLEY DEC-F AMOUNT OF REWARD IN OTHER ALLEY.

LUDHWK67            JEP 67-75/ 37 LUDVIGSON.H.W.GAY
LUDHWL67   -1  DIFF SR/SR RE W/B PRODUCE DIFF IR SPEED RE W/B.                   RAT
LUDHWL67   -2  SPEED TO SMALL REWARD DEC-F AMOUNT OF REWARD IN OTHER ALLEY.
LUDHWL67   -3  ABOVE 2 NOT-F DETENTION AFTER SMALL REWARD.
LUDHWL67   -4  ABOVE 2 DEC-F TIME AFTER SMALL-REWARD CUE ENCOUNTERED.

MALRWK65            PS  65- 2/259 MALOTT.R.W.CUMMING         7

MCHJHK66            PS  66- 6/485 MCHOSE,J.H.LUDVIGSON
MCHJRK66   -1  DIFF AMOUNT SR/SR RE S1/S2 PRODUCE DIFF IR SPEED RE S1/S2.       RAT
MCHJRK66   -2  EQUAL SR/SR RE S1/S2 PRODUCE DIFF IR SPEED IF RUN WITH ABOVE-1.

NEVJAK66            JEAB66- 9/305 NEVIN,J.A.SHETTLEWORTH
NEVJAK66   01  DIFF VI/VI/EXT RE S1/S2/S3 PRODUCE DIFF OR RATE.                  PGN
NEVJAK66   02  RATE TO CONSTANT VI LOW IF FOLLOW SHORTER VI.
NEVJAK66   03  RATE TO CONSTANT VI HIGH IF FOLLOW EXTINCTION.
NEVJAK66   04  ABOVE 2/3 TRANSITORY.

NORAJ262            JCPP62-  /550 NORTH,A.J.
NORAJ362   -1  DIFF SR/NR RE S1/S2 PRODUCE DIFF IR RUN SPEED RE S1/S2.         RAT
NORAJ362   -2  REVERSE DIFF SR/NR RE S1/S2 PRODUCE REVERSE DIFF SPEED RE S1/S2.
NORAJ362   -3  RATE OF REVERSAL DECREASE OVER SEVEN SUCCESSIVE REVERSALS.
NORAJ362   -4  ABOVE 3 NOT-F AMOUNT OF TRAINING ON ORIGINAL PROBLEM.

PENESK67            JEP 67-74/219 PENNES.E.S.ISON
PENESL67   -1  DIFF SR/NR RE S1/S2 PRODUCE DIFF IR SPEED RE S1/S2.             RAT
PENESL67   -2  ABOVE 1 OBTAINED WITH PARTIAL OR CONT REINF IN S+.
PENESL67   -3  SPEED TO S+ EQUAL WITH PARTIAL OR CONT REINF.
PENESL67   -4  SPEED TO S- GREATER WITH PARTIAL THAN CONT REINF IN S+.
PENESL67   -5  MIX ABOVE 1 WITH DISCRIM S1/S2 PRODUCE CHOICE OF S+.
PENESL67   -6  ABOVE 5 GREATER WITH CONT THAN PARTIAL REINF TO S+.
PENESL67   -7  RATE OF EXTINCTION FASTER AFTER CONT THAN PARTIAL REINF TO S+.
PENESL67   -8  RATE OF REVERSAL FASTER AFTER CONT THAN PARTIAL REINF9 TO S+.
PENESL67   -9  SPEED TO OLD S+ FASTER DURING REVERSAL THAN DURING EXTINCTION.

PERCCB59            JEP 59-57/181 PERKINS.C.C.ETAL
PERCCB59   01  DIFF VR/NR RE L1/L2 PRODUCE DIFF OR RATE.                         RAT
PERCCB59   02  CHANGE AUDITORY S WITH S+ PRODUCE GENERALIZATION DECREMENT.
PERCCB59   03  ABOVE-2 GREATER MORE-SIMILAR L1 AND L2 DURING TRAINING.

PORJJ264            PRP 64-15/279 PORTER.J.J.
PORJJ364   -1  DIFF SR/SR RE W/B PRODUCE DIFF IR RUN SPEED RE W/B.             RAT
PORJJ364   -2  MIX ABOVE 1 WITH DISCRIM W/B PRODUCE SOME CHOICE OF LARGER SR.
PORJJ364   -3  INCREASE DIFF SR/SR INCREASE CHOICE OF LARGER SR.

REIDBK55            JEP 55-49/423 REINHOLD.D.B.PERKINS
REIDBB55   01  DIFF SR/NR RE ROUGHT/SMOOTH FLOOR PRODUCE DIFF IR RUN SPEED.   RAT
REIDBB55   02  CHANGE ALLEY BRIGHTNESS WITH S+ PRODUCE DECREASE IN SPEED9
REIDBB55   03  ABOVE-2 GREATER THAN TRAIN WITH CRF OR PRF IN S+ ALLEY ONLY.
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REYGS261           JEAB61- 4/107 REYNOLDS.G.S.
REYGS261   01   DIFF VI/VI OR VR/VR RE S1/S2 PRODUCE DIFF OR RATE.                    PGN
REYGS261   02   RATE IN S1 IS-F SR SCHEDULE IN S2, VICE VERSA.
REYGS261   03   CHANGE VI/VI TO VI/EXT RE S1/S2 PRODUCE INC RATE OF S1.
REYGS261   04   RATE TO S2 DEC FASTER IF CHANGE VI/VI TO EXT/EXT THAN TO VI/EXT.
REYGS261   05   CHANGE EXT/EXT TO VI/EXT PRODUCE INC RATE TO BOTH S1 AND S2.
REYGS261   06   ABOVE-5 RATE TO S2 POS-F RATE TO S2 BEFORE EXTINCTION.

REYGS261           JEAB61- 4/179 REYNOLDS.G.S.
REYGS261   01   DIFF VI/FR RE S1/S2 PRODUCE DIFF OR RATE.                             PGN
REYGS261   02   RELATIVE RATE LINEAR IND-F RELATIVE FREQUENCY OF SR.

RUNWNC58           JEP 58-55/ 51 RUNQUIST.W.N.ETAL
RUNWNC58   -1   DIFF US/NS RE T1/T2 PRODUCE DIFF EYELID CR RE T1/T2.                  MAN
RUNWNC58   -2   ABOVE-1 INC-F 2 VS .3 INTENSITY PUFF US.
RUNWNC58   -3   ABOVE-1 NUMBER CR TO CS+ INC-F INTENSITY OF US.
RUNWNC58   -4   ABOVE-1 NUMBER CR TO CS- INC-F INTENSITY US.

SEWJPB69           JCPP69-67/358 SEWARD.J.P.ETAL
SEWJPB69   01   DIFF SR/NR RE L1/L2 PRODUCE DIFF PANEL PUSH LATENCY.                  RAT
SEWJPB69   02   HEART RATE DECREASE ON S- TRIALS, NOT ON S+ TRIALS.

SHESXK65           JEAB65- 8/199 SHETTLEWORTH.S.NEVIN
SHESXK65   01   DIFF SR/SR DURATION RE S1/S2 PRODUCE DIFF OR RATE.                    PGN
SHESXK65   02   RELATIVE RATE INC-F RELATIVE DURATION OF SR.

SPEKWL54           JEP 54-47/127 SPENCE.K.W.FARBER
SPEKWL54   -1   DIFF US/NS RE CS+/CS- PRODUCE DIFF EYELID CR RE CS+/CS-.              MAN
SPEKWL54   -2   ABOVE-1 INC-F ANXIETY OF SUBJECTS.

SPEKWB59           JEP 59-58/  8 SPENCE.K.W.ETAL
SPEKWB59   01   DIFF SR/NR RE W/B PRODUCE DIFF IR START SPEED.                        RAT
SPEKWB59   02   DIFF SR/NR RE W/B PRODUCE DIFF CHOICE OF S+.
SPEKWB59   03   SPEED TO S+ AND S- FASTER WITH 40 THAN 3 HR/DEP.
SPEKWB59   04   DIFF IN SPEED TO S+ AND S- SAME WITH */ AND ( HR/DEP!
SPEKWB59   05   ABOVE-4 TRUE WITH NUMBER OF TRIALS TO S+ AND S- EQUAL.
SPEKWB59   06   MORE TRIALS TO S+, DIFF IN SPEED GREATER WITH *0 THAN 3 HR/DEP.

TERHS266           JEAB66- 9/613 TERRACE.H.S.
TERHS266   01   DIFF VI/NR RE S1/S2 PRODUCE DIFF OR RATE.                             PGN
TERHS266   02   RATE TO S+ DECREASE WITH EXTENDED TRAINING.
TERHS266   03   ABOVE-2 TERMINAL RATE EQUAL PREDISCRIM RATE TO S+.
TERHS266   04   POST EXTENDED DISCRIM GENERALIZATION GRADIENT PEAK AT S+.

TRAMA266           PS  66- 4/247 TRAPOLD.M.A.
TRAMA266   01   DIFF SR/NR RE S1/S2 PRODUCE DIFF OR RATE.                             RAT
TRAMA266   02   DIFF NONCONTINGENT SR/NR RE S2/S1 FACILITATE REVERSAL AFTER ABOVE-

UHLCN264           PMS 64-19/927 UHL.C.N.
UHLCN264   01   DIFF SR/NR RE S1/S2 PRODUCE DIFF OR RATE.                             RAT
UHLCN264   02   0.4.8 DAYS OVERTRAINING NOT AFFECT REVERSAL.
UHLCN264   03   0.4.8 DAYS OVERTRAINING NOT AFFECT NONREVERSAL SHIFT.
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UHLCNB67             PMS 67-24/ 75 UHL.C.N.ETAL
UHLCNB67  -1  DIFF CRF/NR RE S1/S2 PRODUCE DIFF OR RATE.                   RAT
UHLCNB67  -2  0.4.8 DAYS OVERTRAINING NOT AFFECT REVERSAL.
UHLCNB67  -3  0.4.8 DAYS OVERTRAINING NOT AFFECT NONREVERSAL SHIFT.
UHLCNB67  -4  NONREVERSAL SHIFT FASTER THAN REVERSAL.

WALKC242             JEP 42-31/312 WALKER.K.C.
WALKC342  -1  DIFF SR/NR RE TONE/SILENCE PRODUCE DIFF IR RUN SPEED RE TONE.  RAT
WALKC342  -2  AFTER ABOVE 1. TONE INCREASE RATE OF BAR OR DURING EXTINCTION.

WALAM265             JCPP65-60/ 70 WALL.A.M.
WALAM265  -1  DIFF SR/NR RE TIME SINCE SR PRODUCE DIFF IR LATENCY.             RAT
WALAM265  -2  LATENCY DEC-F OF TIME WITH SR TRIALS ON FI 60-SEC.

WARJMK56             JGTP56-89/ 61 WARREN.J.M.BARON
WARJML56  -1  DIFF SR/NR OF R1/R2 RE S1/S2 PRODUCE DIFF R1/R2 RE S1/S2.       CAT
WARJML56  -2  DISCRIM SR/NR RE S1/S2 PRODUCE CHOICE OF S+.
WARJML56  -3  MORE ERRORS IN ABOVE 1 THAN IN ABOVE 2. WITHIN S.
WARJML56  -4  REPLICATE ABOVE 3 BETWEEN S.

BAKTW269             JEP 69-79/347 BAKER.T.W.
BARAXK68             JEAB68-11/177 BARON.A.KAUFMAN
BORRTK65             JCPP65-60/ 64 BROWN.R.T.LOGAN
BORDGB69             JEAB69-12/119 BORN.D.G.ETAL
BOWGXK64             JEAB64- 7/401 BOWER.G.GRUSEC
BRAWGK69             JEAB69-12/773 BRAUD.W.G.WEIBLE
BROTSB63             JCPP63-56/190 BROWN.T.S.ETAL
BRUSXK65             ABE 65-25/359 BRUTKOWSKI.S.DABROWSKA
CATAC261             JEAB61- 4/335 CATANIA.A.C.
CHUVI257             ZVND57- 7/126 CHUMAK.V.I.
CHUVI257             ZVND57- 7/114 CHUMAK.V.I.
CLAFC269             JEAB69-12/977 CLARK.F.C.
COLSRB65             PS  65- 3/467 COLEMAN.S.R.ETAL
CROEK268             JEAB68-11/117 CROSSMAN.E.K.
CUMWWK65             PS  65- 3/313 CUMMING.W.W.ECKERMAN
DAMCAK69             JEP 69-82/554 DAMMANN.C.A.PERKINS
DANTX269             JEAB69-12/127 D'ANDREA.T.
DOBCXB66             SC  66-15/ 87 DOBRZECKA.C.ETAL
ECKCO269             JEAB69-12/551 ECKERMAN.C.O.
FARGWK68             JEAB68-11/743 FARTHING.G.W.HEARST
FISHDK66             JEP 66-71/535 FISHBEIN.H.D.GORMEZANO          1
FLERAB68             JEP 68-78/178 FLEMING.R.A.ETAL                1
FLERAB68             JEP 68-77/295 FLEMING.R.A.ETAL                1
FOTDLK69             JEP 69-  /  9 FOTH.D.L.RUNQUIST
FREPWK67             JCPP67-64/277 FREY.P.W.ROSS                   1/
FUHMJ264             JCPP64-58/283 FUHRER.M.J.                     1
GANLX263             JEP 63-65/270 GANZ.L.
GRIGRK58             JEP 58-55/565 GRICE.G.R.DAVIS                 1
GRUTX268             JEAB68-11/239 GRUSEC.T.
GUTNXK56             JEP 56-51/ 79 GUTTMAN.N.KALISH                7
GYNMD257             JEP 57-  /408 GYNTHER.M.D.                    1
HAIJP269             JCPP69-67/465 GAILMAN.J.P.
HAMLJ266             PS  66- 5/337 HAMMOND.L.J.                    1
HARTFK62             JEP 62-64/131 HARTMAN.T.F.GRANT               1
HARTF263             JEP 63-65/194 HARTMAN.T.F.                    1
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         JEP 63-65/19                                              ARTF 26/3 /

HEAEX260        JCAB60- 3/ 49 HEARST,E.                  7
HENDP269        JEAB69-12/799 HENDRY,D.P.ETAL
HERRJ258        JEAB58- 1/351 HERRNSTEIN,R.J.            7
HERRJK58        JEAB58- 1/293 HERRNSTEIN,R.J.BRADY       7
HERRM264        JCPP64-57/139 HERRICK,R.M.               7
HICCWB67        JCNP67-76/125 HICKOK,C.W.ETAL            1
HILER337        AJP 37-49/564 HILGARD,E.R.ETAL           1
HILER338        AJP 38-51/498 HILGARD,E.R.ETAL           1
HONWKB59        JEP 59-58/145 HONIG,W.K.ETAL             7
HONWKK62        SC  62-13/ 29 HONIG,W.K.DAY              7
HONWKB63        JCPP63-56/111 HONIG,W.K.,ETAL            7-101001-0-02-50
HYMAX269        JEAB69-12/641 HYMAN,A.
ISOJRK68        JCPP68-65/524 ISON,J.R.GLASS
ISOJRK68        JEP 68-77/350 ISON,J.R.ADINOLF
ISOJR269        JEP 69-81/ 81 ISON,J.R.
ISOJRK69        JEP 69-80/183 ISON,J.R.KRANE
JOHDFK68        JEAB68-11/157 JOHNSON,D.F.CUMMING
JOHRHK69        JCPP69-69/485 JOHNSON,R.H.THOMPSON
KELRTR62        JEAB62- 5/  3 KELLEHER,R.T.RIDDLE        7
KENSB264        PS  64- 1/165 KENDALL,S.B.               7
KENSB265        JEAB65- 8/305 KENDALL,S.B.               7
KENSB265        PS  65- 3/279 KENDALL,S.B.               7
KENSBK65        PRP 65-15/545 KENDALL,S.B.GIBSON         7
KHAMM255        ZVND55- 5/565 KHANANASHVILI,M.M.         1
KHAMM260        ZVND60-10/874 KHANANASHVILI,M.M.         1
KIMHDK63        JEP 63-65/559 KIMMEL,H.D.PENNYPACKER     1
KLOAM257        ZVND57- 7/263 KLOCHKOV,A.M.              1
KOLIG256        ZVN[illegible]/751 KOLOGRIVOVA,IU.G.     1
KWASEK69        JEP 69-79/547 KWATERSKI,S.E.MOORE
LANDGK68        JEAB68-11/517 LANDER,D.G.IRWIN
LANDG268        JEAB68-11/711 LANDER,D.G.
LAWDH252        JCPP52-45/511 LAWRENCE,D.H.
LAWRXB68        JEAB68-11/561 LAWSON,R.ETAL
LINDR269        JCPP69-69/573 LINDEN,D.R.
LOGFA266        JEP 66-71/616 LOGAN,F.A.
MANAAB69        JEP 69-80/225 MANNING,A.A.ETAL
MARRNK69        JEAB69-12/759 MARINER,R.W.THOMAS
MARGX269        JCPP69-68/268 MARSH,G.
MASDWK67        JEP 67-75/151 MASSARO,D.W.MOORE
MATRT269        JCPP69-68/589 MATSUMOTO,R.T.
MCCGE257        JCPP57-50/436 MCCLEARN,G.E.
MELGRK69        JCPP69-67/390 MELLGREN,R.L.OST
MENKWK69        JCPP69-68/558 MCENENEY,K.W.BUTTER
MERALK67        PS  67- 9/139 MEREDITH,A.L.SCHNEIDERMAN
MHOJH269        JEP 69-81/256 MCHOSE,J.H.
MILCGB69        JCPP69-68/249 MILES,C.G.ETAL
MILLX269        JEAB69-12/293 MILLER,L.
MKIFRK67        PS  67- 7/395 MACKINNON,F.R.RUSSOTTI
MOOJW264        JEP 64-  /250 MOORE,J.W.                 1
MOYMJK69        JEP 69-81/469 MOYER,M.J.ROSS
NATMAK68        JEAB68-11/ 77 NATHAN,M.A.SMITH
NEVJA268        JEAB68-11/715 NEVIN,J.A.
NEWFLK69        JEP 69-80/146 NEWMAN,F.L.WOODHOUSE
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            JEAB68-11/71                                                       EVJA 26/8 /

OBRFX268             JEAB68-11/537 O'BRIEN,F.
OVEJB266             PS  66- 5/ 25 OVERMIER,J.B.                 1
PARWP269             JCPP69-68/364 PARE,W.P.
PECRXK67             JPE 67-73/187 PECKHAM,R.AMSEL
PLAJRK68             JEP 68-77/393 PLATT,J.R.GAY
PLAJRB69             JEP 69-82/ 38 PLATT.J.R.ETAL
PLISSB68             JEAB68-11/271 PLISKOFF,S.S.ETAL
PROWFB68             PS  68-12/ 58 PROKASY,W.F.ETAL
PROWFK69             JEP 69-80/271 PROKASY,W.F.ALLEN
REYGS268             JEAB68-11/453 REYNOLDS,G.S.
REYGSK68             JEAB68-11/543 REYNOLDS,G.S.LIMPO
REYGSK69             JEAB69-12/911 REYNOLDS,G.S.LIMPO
RICEJ269             JEP 69-82/148 RICKERT,E.J.
RILMX268             JEAB68-11/129 RILLING,M.
RILMXB69             JEAB69-12/917 RILLING,M.ETAL
ROSLEB67             PS  67- 9/333 ROSS,L.E.ETAL                 1
RUNWNB62             PRP 62-11/ 43 RUNQUIST,W.N.ETAL             1
SADSX269             JEAB69-12/933 SADOWSKY,S.
SAUJC269             JEAB69-12/951 SAUNDERS,J.C.
SCHDRK68             JEAB68-11/571 SCHMITT,D.R.MARWELL
SCHRXK68             JEAB68-11/777 SCHUSTER,R.RACHLIN
SCHHXB69             JCPP69-67/212 SCHUCKMAN,H.ETAL
SENGMK67             JCPP67-64/121 SENF,G.M.MILLER               1
SERPXK69             JEAB69-12/767 SERAFANIAN,P. VOM SAAL
SHEJAK68             JEAB68-11/689 SHERMAN,J.A.THOMAS
SHICP269             JEAB69-12/403 SHIMP,C.P.
SHUSAB69             JCPP69-67/ 64 SHUMAKE,S.A.ETAL
SPEKWK54             JEP 54-48/399 SPENCE,K.W.BEECROFT           1
SPEKWK63             JEP 63-65/ 35 SPENCE,K.W.TANDLER            1
SPENEK66             PM  66-80/ 10 SPEAR,N.E.PAVLIK
SPENEK69             JCPP69-68/427 SPEAR,N.E.SPITZNER
SPENEK70             JEP 65-70/510 SPEAR,N.E.HILL
STAJE269             JEAB69-12/583 STADDON,J.E.R.
STUAX268             JEAB68-11/223 STUBBS,A.
SUTNS269             JCPP69-67/160 SUTHERLAND,N.S.
SWIRWB66             JEP 66-72/661 SWITALSKI,R.W.ETAL            7
TERMXK68             JEAB68-11/ 29 TERMAN,M.KLING
TERHS268             JEAB68-11/727 TERRACE,H.S.
TERHS269             JEAB69-12/571 TERRACE,H.S.
THODRB69             JEAB69-12/105 THOMAS,D.R.ETAL
TIGTJB68             JEAB68-11/199 TIGHE,T.J.ETAL
TRAMAB68             JEP 68-76/568 TRAPOLD,M.A.ETAL              1
TULCXK68             JEAB68-11/147 TULLIS,C.WALTERS
VETEHK68             JEAB68-11/753 VETTER,E.H.HEARST
WALAMK64             PS  64- 1/193 WALL,A.M.GOODRICH             7
WEIAX261             JEAB61- 4/365 WEISSMAN,A.                   7
WEIKM268             JEAB68-11/767 WEISS,K.M.
WEIRE269             JEAB69-12/443 WEISMAN,R.E.
WEIREK69             JEAB69-12/229 WEISMAN,R.E.PALMER
WILRSK67             JCPP67-63/ 87 WILSON,R.S.DUERFELDT          1
WILJSK69             JEP 69-82/272 WILCOX,J.M.ROSS
WILJL269             JCPP69-68/118 WILLIAMS,J.L.
WILRNK69             JEAB69-12/905 WILTON,R.N.GAY
WILRNK69             JEAB69-12/239 WILTON,R.N.GAY
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        JEAB69-12/22                                        FIRE 26/9 /

YARMXB68        JEAB68-11/415 YARCZOWER,M.ETAL
YARMXK69        JEAB69-12/563 YARCZOWER,M.SWITALSKI
YEHAL268        JEP 68-77/468 YEHLE,A.L.
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                                                                DATE 12/05/76
LITERATURE OF LEARNING ... LAWS OF DIFFERENTIAL CONDITIONING
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0000 4     XDC ACQUISITION ... EXPER IVAR THAT AFFECT RATE OF XDC OPERATIONS.
0001 4     XDC   CUE ... EVENTS THAT CAN DIFFERENTIALLY CONTROL BEHAVIOR.
0002 4     XDC   CONVENTION ... S+ ENCOUNTER SR, S- NONREINFORCED.
0003 4     XDC   CONVENTION ... S1 ENCOUNTER PREFERRED SR, S2 NONPREFERRED SR.

0100 4     XDC STIMULUS CONTROL INC-F DIFFERENTIAL IN S.
0100 4+    XDC      NO DIFF S1/S2 EQUALS VARIED REINFORCEMENT.
0101 4     XDC   RATE AND LIMIT OF CONTROL INC-F DIFF ALONG AN S CONTINUUM.
0102 4     XDC   XDC DEC-F NUMBER COMMON ELEMENTS IN S+ AND S-.
0103 4     XDC   XDC INC-F NUMBER RELEVANT CUES.
0120 4     XDC STIMULUS CONTROL INC-F DIFFERENTIAL IN SR (ONE VALUE CONSTANT).
0121 4     XDC   RATIO CONSTANT, XDC BEST AT INTERMED ABSOLUTE VALUES OF SR.
0140 4     XDC XDC FASTER WITH CONSTANT S THAN IF S+ VARY.
0140 4+    XDC   NOTE RANGE OF VARIATION OF S+ RE S-.
0141 4     XDC   XDC FASTER WITH CONSTANT S THAN IF S- VARY.
0142 4     XDC   XDC FASTER WITH CONSTANT S THAN IF S+ AND S- BOTH VARY.
0143 4     XDC   XDC FASTER IF VARY S- THAN IF VARY S+, OTHER S CONSTANT.
0143 4+    XDC   NOTE EFFECT OF INITIAL STRENGTH OF RESPONSE TO S+ AND S-.

0300 4     XDC PRE-EXPERIMENTAL VARIABLES THAT AFFECT RATE OF XDC.
0310 4     XDC RATE OF XDC IS-F INITIAL R TO S1,S2.
0311 4     XDC   RATE OF XDC DEC-F PRETRAIN NONDIFF SR TO S+ AND S-.

1000 4     XDC MEASURES OF STIMULUS CONTROL

1100 4     XDC DIFF CLASSICAL COND PRODUCE DIFF CR RE S1/S2.
1110 4     XDC   DIFF CLASS COND S INTENSITY BETTER MORE INTENSE S AS S+.

1200 4     XDC DIFF OPERANT COND PRODUCE DIFF OR RATE RE S1/S2.
1201 4     XDC      DIFF VI/NR RE S1/S2 PRODUCE DIFF OR RATE.
1202 4     XDC      DIFF VR/VR RE S1/S2 PRODUCE DIFF OR RATE.
1203 4     XDC      DIFF FI/FREE SR ON SAME FI RE S1/S2 PRODUCE DIFF OR RATE.
1204 4     XDC      DIFF VI/DRL RE S1/S2 PRODUCE DIFF OR RATE.
1205 4     XDC      DIFF VI/OFR RE S1/S2 PRODUCE DIFF OR RATE.
1220 4     XDC OR RATE IN S1 IS-F SR RATE IN S2.
1221 4     XDC   RATE GREATER THAN SAME SCHED IN S1 ONLY WHEN S2 LOWER SR RATE.
1221 4-    XDC      TERM 1221 ... POSITIVE BEHAVIORAL CONTRAST.
1222 4     XDC   RATE LOWER THAN SAME SCHED IN S1 ONLY WHEN S2 HIGHER SR RATE.
1222 4-    XDC      TERM 1222 ... NEGATIVE BEHAVIORAL CONTRAST.
1223 4     XDC   SHIFT FROM S1 TO S2 PRODUCE TEMPORARY OVER DEPRESSION OF OR RATE
1224 4     XDC      ABOVE 1223 INC-F DURATION OF S1 BEFORE SHIFT.
1225 4     XDC   SHIFT FROM S2 TO S1 PRODUCE TEMPORARY OVER ELEVATION OF OR RATE.

1300 4     XDC DIFF INSTRUMENTAL COND PRODUCE DIFF IR SPEED.
1301 4     XDC   DIFF SR/NR RE S1/S2 PRODUCE DIFF IR SPEED.
1302 4     XDC   R TO S+ SMALL CONCAVE INC-F DIFF S1,S2.
1303 4     XDC   R TO S- LARGE CONVEX DEC-F DIFF S1,S2.
1304 4     XDC   ABOVE 0151 AND 0152 ORIGINATE TOGETHER AT SUBSTANTIAL R.
1304 4+    XDC   ABOVE 0253 EQUIVALENT TO PARTIAL REINFORCEMENT OF ONE S.
1305 4     XDC   R TO S+ LARGE CONCAVE INC-F PROPORTION OF TRIALS TO S+.
1306 4     XDC   R TO S- SMALL CONCAVE INC-F PROPORTION OF TRIALS TO S+.
1307 4     XDC   DIFFERENCE ABOVE 0254,0255 DEC-F SIMILARITY OF S1,S2.
1307 4+    XDC   DIFFERENCE ABOVE 0254,0255 AT 100 EQUIVALENT S GENERALIZATION.
1308 4     XDC   MAXIMUM DIFFERENCE R1,R2 IF EQUAL TRIALS TO S+ AND S-.
1309 4     XDC   R TO SMALL SR LOWER THAN R TO THAT SR IN INSTRUMENTAL COND.
1309 4-    XDC   TERM 0258 ... NEGATIVE INCENTIVE CONTRAST
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2000 4    XDC COMPOUND/COMPLEX DIFFERENTIAL CONDITIONING.

2010 4    XDC MEASURE RELEVANCE OF A CUE ... RC
2011 4    XDC   H(SR) = UNCONDITIONAL ENTROPY RE REINFORCEMENT.
2012 4    XDC   H(C/SR) = CONDITIONAL ENTROPY GIVEN A CUE.
2013 4    XDC   DEFINE ... RC = (H(SR) - H(C/SR)) / H(SR)
2014 4    XDC   WHERE H(SR) = -SUM P LOG2 P OVER SR EVENTS INCLUDING NONREINF.
2015 4    XDC   AND H(C/SR) = -SUM P(I,J) LOG2 P(J/I)
2016 4    XDC     I OVER CUE EVENTS INCLUDING NO STIMULUS.
2017 4    XDC     P(I,J) OVERALL PROBABILITY CUE AND SR EVENTS OCCUR.
2018 4    XDC     P(J/I) PROBABILITY OF SR EVENT GIVEN A CUE EVENT.
2019 4    XDC   CUE IRRELEVANT WHEN MEASURE EQUALS ZERO.

2100 4    XDC RATE OF XDC INC-F NUMBER RELEVANT-REDUNDANT CUES.
2110 4    XDC RATE OF XDC DEC-F NUMBER OF PARTIALLY RELEVANT CUES.
2111 4    XDC   ABOVE 1110 INC-F RELEVANCE OF PARTIALLY RELEVANT CUE.
2112 4    XDC   PARTIALLY RELEVANT CUE GAIN SOME DIFF CONTROL OVER BEHAVIOR.
2120 4    XDC RATE OF XDC DEC-F NUMBER OF IRRELEVANT CUES.

2200 4    XDC IF COMPOUND SEVERAL RELEVANT CUES, EACH MAY CONTROL BEHAVIOR.
2201 4    XDC   STIMULUS CONTROL BY ELEMENTS OF COMPOUND INC-F CUE SALIENCE.
2202 4    XDC   STIMULUS CONTROL BY ELEMENTS OF COMPOUND INC-F CUE RELEVANCE.
2203 4    XDC   STIMULUS CONTROL BY ELEMENTS OF COMPOUND DEC-F AMT OF TRAINING.
2203 4-   XDC   TERM ABOVE 1203 ... COMPOUNDING OR PATTERNING
2204 4    XDC   ELEMENTS CAN GAIN OPPOSITE CONTROL THAN OCCUR IN COMPOUND.
2210 4    XDC CUE1 REL, CUE2 IRREL THAN BOTH REL PRODUCE LITTLE CUE2 CONTROL.
2220 4    XDC XDC CUE1 THEN SUPERIMPOSE REL-REDUN CUE2 PROD LITTLE CUE2 CONTROL.
2220 4-   XDC   TERM ABOVE 1220 ... MASKING OR OVERSHADOWING


3000 4    XDC REVERSAL/TRANSFER OF DIFFERENTIAL CONDITIONING

3100 4    XDC REVERSE CONDITIONS RE S1/S2 PRODUCE REVERSAL IN STIMULUS CONTROL.
3110 4    XDC DIFF IN R RE S1/S2 DEC-F NUMBER OF REVERSALS
3120 4    XDC RATE OF REVERSAL DEC-INC-F NUMBER OF TRIALS ORIGINAL TRAINING.
3120 4-   XDC      TERM INC-F IN 3120 ... OVERTRAINING REVERSAL EFFECT (ORE).
3121 4    XDC   ORE RESULTS FROM FASTER EXTINCTION OF OLD S+.

3400 4    XDC RATE OF DIFFICULT XDC FACIL BY EASY XDC SAME CONTINUUM.
3400 4+   XDC   STATE HOW EASY AND HOW MUCH TRAINING.
3401 4    XDC   AFOVE 3400 GREATER IF S- SAME IN EASY AND DIFFICULT THAN S+ SAME
3410 4    XDC RATE OF DIFFICULT XDC FACIL IF MOVE GRADUALLY FROM EASY XDC.
3410 4+   XDC   STATE RULES FOR GRADUATING.
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S 0044

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4000 4    XDC RESPONSE DIFFERENTIATION IN DIFFERENTIAL CONDITIONING

4100 4    XDC DIFF SR OF R1/R2 RE S1/S2 PRODUCE CHOICE OF R1/R2 RE S1/S2.


5000 4    XDC PROBE STIMULUS GENERALIZATION AFTER DIFFERENTIAL CONDITIONING.

5100 4    XDC XDC(1,3,5) PRODUCE GRADIENT OF R TO S BETWEEN S+,S-.
5101 4    XDC   ABOVE 5100 STEEPER THAN AFTER TRAIN TO S+ ALONE.
5101 4-   XDC   TERM 5101 ... POST-DISCRIMINATION GENERALIZATION GRADIENT.
5101 4+   XDC   SPECIFY DIFF S+,S- INCL IDENTITY (PARTIAL REINF).
5110 4    XDC R TO S INC-DEC-F DIFF FROM S+ CONTRALATERAL FROM S-.
5110 4-   XDC   TERM INC IN ABOVE 5110 ... PEAK SHIFT.
5120 4    XDC R TO S DEC-F DIFF FROM S- CONTRALATERAL FROM S+.
5130 4    XDC GENERALIZATION ALONG ONE DIMENSION DEC-F XDC ANOTHER DIMENSION
5131 4    XDC   ABOVE 5130 GREATER MORE DIFFICULT XDC.

5200 4    XDC EQUAL SR/SR RE S1/S2 PRODUCE SUMMATED GENERALIZATION GRADIENTS.

6000 4    XDC PROBE EXTINCTION AFTER DIFFERENTIAL CONDITIONING.

6100 4    XDC NONREINF S1 AFTER DIFF SR/NR RE S1/S2 PRODUCE EXTINCTION R TO S1.
6110 4    XDC RATE OF 6100 INC-DEC F AMOUNT OF DIFF COND TRAINING.
6111 4    XDC   AFTER SMALL AMT TRNG, REXT OF S1 GREATER THAN CRF TO S1 ONLY.
6112 4    XDC   AFTER SMALL AMT TRNG, REXT OF S1 EQUAL TO PR TO S1 ONLY.
6113 4    XDC   AFTER LARGE AMT TRNG, REXT OF S1 EQUAL TO CRF TO S1 ONLY.
6114 4    XDC   AFTER LARGE AMT TRNG, REXT OF S1 LESS THAN PR TO S2 ONLY.
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S 0028

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                                                                     DATE 12/[illegible]/7[illegible]
LITERATURE OF LEARNING ... REFERENCES FOR LAWS OF DIFFERENTIAL CONDITIONING
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0101 5    XDC BIRDXB63

1201 5    XDC AMELLK65, BLOTM266
1202 5    XDC BERJWK67
1203 5    XDC APPJBK62
1204 5    XDC BLOTM267
1205 5    XDC BLOTM267
1221 5    XDC AMELLK65, BLOTM266, BLOTM267
1222 5    XDC BLOTM267
1223 5    XDC BERJWK67
1224 5    SEX BERJWK67
1225 5    XDC BERJWK67
1301 5    XDC BERRNB43, BIRDXB60, BIRDXB63

3110 5    XDC BERRNB43
3120 5    XDC BIRDXB60
3121 5    XDC BIRDSB60

4100 5    XDC BOARA269

5100 5    XDC AMELLK65
5200 5    XDC BLODS269

6113 5    XDC BIRDXB63
6114 5    XDC BIRDXB63


S 0030
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                                                           :  DATE 12/03/70

LITERATURE OF LEARNING ... THEORIES OF DIFFERENTIAL CONDITIONING
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PAVIP327          PAVLOV.I.P.
PAVIP627   -1  ADVANTAGE OF CR IS THAT US FIND MOISTENING SALIVA IN MOUTH.
PAVIP627   -2  SALIVARY CR EVOKES MOTOR COMPONENT OF COMPLEX REFLEX.
PAVIP627   -3  ALERT STATE OF NERVOUS SYSTEM ESSENTIAL TO FORMATION OF NEW CR.
PAVIP627   -4  AN EXTERNAL STIMULUS EXCITES A CENTER IN THE BRAIN.
PAVIP627   -5  ANY S THAT OCCURS WHEN CENTER IS EXCITED IS CONDUCTED TO IT.
PAVIP627   -6  PATHS BY WHICH SO CONDUCTED BECOME SPECIALLY MARKED OUT.
PAVIP627   -7  A STIMULUS TRACE IS LEFT IN THE NEVROUS SYSTEM AFTER S IS REMOVED.

SPEKW336          SPENCE.K.W.
SPEKW636   -1  ANY STIMULUS IS A COMPOUND OF ELEMENTS.
SPEKW636   -2    STIMULUS ELEMENT IS DEFINED PRIMARILY BY ITS ABSOLUTE PROPERTIES
SPEKW636   -3    RELATIONAL ELEMENTS ACKNOWLEDGED WHEN NECESSARY FOR SOLUTION.
SPEKW636   -4    DISTAL ELEMENTS EFFECTIVE ONLY IF FALL ON SUITABLE RECEPTOR.
SPEKW636   -5    MAY REQUIRE RECEPTOR ORIENTING ACT TO MAXIMIZE DISTINCTIVENESS.
SPEKW636   -6  RESPONSE IS APPROACH TO A STIMULUS COMPLEX.
SPEKW636   -7    EACH S ELEMENT HAS INDEPENDENT TENDENCY TO ELICIT APPROACH R.
SPEKW636   -8    NET APPROACH TENDENCY IS SUM OF OF ELEMENT TENDENCIES.
SPEKW636   -9    SPEED OR VIGOR OF APPROACH R INC-F NET APPROACH TENDENCY.
SPEKW636   10    IN A CHOICE SITUATION. R WITH STRONGER NET TENDENCY IS SELECTED.
SPEKW636   11  REINFORCEMENT PRODUCE INCREASE IN APPROACH TENDENCY (E).
SPEKW636   12    REINFORCEMENT AFFECTS EACH EFFECTIVE STIMULUS ELEMENT.
SPEKW636   13    INCREMENT IN E PER REINFORCEMENT INC-OGIVAL-F PRE-EXISTING E.
SPEKW636   14    INCREMENT IN E TO ONE ELEMENT GENERALIZES TO SIMILAR ELEMENTS.
SPEKW636   15    GENERALIZATION CONCAVE-DOWNWARD FUNCTION OF STIMULUS SIMILARITY.
SPEKW636   16    STIMULUS SIMILARITY MEASURED BY NATURAL METRIC.
SPEKW636   17  NONREINFORCEMENT PRODUCE INCREMENT IN INHIBITORY POTENTIAL (I)
SPEKW636   18    NONREINFORCEMENT AFFECTS EACH EFFECTIVE STIMULUS ELEMENT.
SPEKW636   19    INCREMENT IN I INC-LINEAR-F PRE-EXISTING E-I.
SPEKW636   20    INCREMENT IN I TO ONE ELEMENT GENERALIZES TO SIMILAR ELEMENTS.
SPEKW636   21  NET APPROACH TENDENCY OF ANY ELEMENT DETERMINED BY E-I.


DS 0036
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                          LOGAN...LAWS OF LEARNING
                          A7 ... CONDITIONING, SENSORY

0100 4   A7SCD PAIR(S1,S2) PRODUCE SENSORY R2 TO S1.
0110 4   A7SCD PAIR(S1,S2) THEN DETECT S1 BETTER WITH THAN WITHOUT S2.VV.
0111 4   A7SCD ABOVE-0110 BETTER IF MOTOR R DURING PAIRING.
0200A4   A7SCD PAIR(S1,S2) THEN TRAIN(S2,AR) PRODUCE AR TO S1.
0201A4   A7SCD ABOVE 0200A DISCONTIN-F TEST S INTERMED S1 AND S2.
0200C4   A7SCD PAIR(S1,S2) THEN PAIR(S2,US) PRODUCE CR TO S1.
0200I4   A7SCD PAIR(S1,S2) THEN TRAIN(S2,IR) PRODUCE IR TO S1.
0201I4   A7SCD ABOVE 0200I NOT OCCUR IF INSTRUCT MAN NOT IR TO S1.
0210C4   A7SCD N/EXT S1-CR ABOVE-0200C EQUAL TO PAIR(S1,US).
0220C4   A7SCD ABOVE 0200C REDUCED BY S1 ALONE AFTER PAIRING.
0220I4   A7SCD ABOVE 0200I NOT ELIM BY S2 ALONE AFTER PAIRING.
0221C4   A7SCD ABOVE-0200C NOT REDUCED BY PAIR(S2,S1) AFTER PAIR(S1,S2).
0230C4   A7SCD ABOVE-0200C DEC-F INTENSITY OF S1 AND S2.
0300 4   A7SCD PAIR(S1,S2) THEN PAIR(S2,US) FACIL COND PAIR(S1,US).
0310 4   A7SCD ABOVE-0300 INC-F DEP DURING PAIR(S1,S2).
0400 4   A7SCD MIX(S1-R,S2-R) THEN TRAIN(S2,AR) PRODUCE AR TO S1.
0500 4   A7SCD SENSORY PRE-COND IS-F ISI DURING PAIRING.


                          LOGAN...LAWS OF LEARNING
                          A7 ... REFERENCES

0100 5   A7SCD BOGAI037 ELLDG041 LEUCS040
0110 5   A7SCD BROWJ050 CASHX036
0111 5   A7SCD CASHX036
0200A5   A7SCD HOFFDR+60 KARHW047 KENSB-60 SEIRJ058 WICDD-51
0201A5   A7SCD KENSB-60
0200C5   A7SCD BITME+53 BROWJ039 COPWJ058 LOVSH059
0200I5   A7SCD BROWJ047 CHERX-49 *REIRL052
0201I5   A7SCD CHERX-49
0210C5   A7SCD BITME+53
0220C5   A7SCD COPWJ058
0220I5   A7SCD BROWJ047
0221C5   A7SCD COPWJ058
0230C5   A7SCD THOGL056
0300 5   A7SCD BAHHP052 BAHHP053 *BROWJ042
0310 5   A7SCD BAHHP052 BAHHP053
0400 5   A7SCD WICDD-51
0500 5   A7SCD COPWJ058 HOFDR+58 SILCA-54 WICDD-63


                          LOGAN...FACTS OF LEARNING
                          A7 ... CONDITIONING, SENSORY

BAHHP352A7-1  PAIR(TONE,LITE) THEN AVOID(TONE,SHOCK) FACIL AVOID(LITE,SHOCK).RAT
BAHHP352A7-2  ABOVE-1 INC-F FOOD/WATER DEP DURING PAIRING.
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                                                                                 DATE 12/09/7
RAHHP353A7-1   PAIR(LITE,BUZZ) THEN AVOID(BUZZ,SHOCK) FACIL AVOID(LITE,SHOCK).RAT
RAHHP353A7-2   ABOVE-1 SIGNIF IF FOOD DEP.
RITYEC53A7-1   S1-GSR N/EXT EQUAL IF PR(S1,US) OR ORDER ((PR(S1,S2),PR(S2,US))MAN
ROGAI337A7-1   PAIR(T/DARK,LITE) PRODUCE SENSORY R(LITE) TO T/DARK.           MAN
ROGAI337A7-2   PAIR(TONE,LITE) PRODUCE SENSORY R(LITE) TO TONE.               MAN
BROWJ339A7-1   PR(BELL,LITE) THEN PR(BELL,SHOCK) PRODUCE FLEXION TO LITE.VV.  DOG
BROWJ342A7-1   PR(LITE,TONE) THEN PR(TONE,SHOCK) NOT FACIL PR(LITE,SHOCK).    MAN
BROWJ347A7-1   PAIR(LITE,TONE) THEN TRAIN(LITE,PRESS) PRODUCE PRESS TO TONE.  MAN
BROWJ347A7-2   ABOVE-1 NOT ELIM BY LITE ALONE AFTER PAIRING.
BROWJ350A7-1   PAIR(TONE,LITE) THEN DETECT TONE BETTER WITH THAN WITHOUT LITE.MAN
CASHX336A7-1   PAIR(LITE,SOUND) THEN LITE AFFECT APPARENT INTENSITY SOUND.VV. MAN
CASHX336A7-2   ABOVE-1 SIGNIF IF MOTOR ACT DURING PAIRING.
CHERXL49A7-1   PAIR(TONE,LITE) THEN INSTRUCT VR TO LITE PRODUCE VR TO TONE.   MAN
CHERXL49A7-2   ABOVE-1 NOT OCCUR IF INSTRUCT NOT VR TO TONE.
COPWJ358A7-1   PAIR(TONE,LITE) THEN PAIR(LITE,SHOCK) PRODUCE GSR TO TONE.     MAN
COPWJ358A7-2   ORDER((PR(TONE,LITE),TONE-ALONE,PR(LITE,SHOCK)) REDUCE GSR TO TONE
COPWJ358A7-3   ORD((PR(TONE,LITE),PR(LITE,TONE),PR(LITE,SHOCK)) PROD GSR TO TONE.
COPWJ358A7-4   PAIR(LITE,TONE) THEN PAIR(LITE,SHOCK) NOT PRODUCE GSR TO TONE.
ELLDG341A7-1   PAIR(LITE,TONE) THEN HEAR TONE WHEN PRESENT LITE.              MAN
HOFDRC58A7-1   SENSORY PRE-COND IRREG-F ISI.                                  MAN
HOFDRC60A7-1   PR(TONE,LITE) THEN TR(LITE,AR) PROD AR TO TONE INC-DEC-F N/PR. CAT
KARHW347A7-1   PAIR(LITE,BUZZ) THEN AVOID(BUZZ,SHOCK) PRODUCE AR TO LITE.     MAN
KENSBL60A7-1   PAIR(TONE1,TONE2) THEN AVOID(TONE2,SHOCK) PRODUCE AR TO TONE1. CAT
KENSBL60A7-2   ABOVE-1 R DISCONTIN-F TEST INTERMED TONES.
LEUCS340A7-1   PAIR(BELL,PRICK) PRODUCE SENSORY R(PRICK) TO BELL.HYPNOSIS.    MAN
LOVSH359A7-1   PAIR(BUZZ,LITE) THEN PAIR(LITE,SHOCK) PRODUCE GSR TO BUZZ.     MAN
LOVSH359A7-2   ABOVE-1 NOT ELIM IF PREVENT R DURING PAIRING.
REIRL352A7-1   PAIR(BUZZ,LITE) THEN TRAIN(LITE,IR) NOT PRODUCE IR TO BUZZ.VV. PGN
SEIRJ358A7-1   PAIR(S1,S2) THEN AVOID(S2,US) PRODUCE AR TO S1.                RAT
SEIRJ358A7-2   ABOVE-1 NOT AFFECTED BY DEP.
SILCAL54A7-1   PAIR(LITE,BUZZ) THEN TRANSFER IS-F ISI DURING PAIRING.         RAT
THOGL356A7-1   PAIR(LITE,SOUND) PRODUCE SENSORY PRE-COND IF S WEAK.           RAT
WICDDL51A7-1   PAIR(TONE,LITE) THEN AVOID(TONE,SHOCK) PRODUCE AR TO LITE.     MAN
WICDDL51A7-2   MIX(TONE-R,LITE-R) THEN AVOID(TONE,SHOCK) PRODUCE AR TO LITE.
WICDDL63A7-1   PR(LITE,TONE) THEN PR(LITE,SHOCK) PROD TONE-GSR INC-DEC-F ISI. MAN
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LOGAN...LAWS OF LEARNING
TRADITIONAL TOPIC HEADINGS

A0 CONDITIONING, GENERAL
A1 CONDITIONING, AVOIDANCE
A2 CONDITIONING, CLASSICAL
A3 CONDITIONING, ESCAPE
A4 CONDITIONING, HIGHER-ORDER
A5 CONDITIONING, INSTRUMENTAL
A6 CONDITIONING, OPERANT
A7 CONDITIONING, SENSORY
A8 CONDITIONING, VERBAL
A9 CONDITIONING, OTHER

B0 DIFFERENTIATION, GENERAL
B1 DIFFERENTIATION, DISCRIMINATION
B2 DIFFERENTIATION, REVERSAL
B3 DIFFERENTIATION, TRANSFER
B4
B5
B6
B7
B8
B9 DIFFERENTIATION, OTHER

C0 DISCRIMINATION, GENERAL
C1 DISCRIMINATION, CLASSICAL
C2 DISCRIMINATION, COMPOUND/COMPLEX
C3 DISCRIMINATION, DRIVE
C4 DISCRIMINATION, MIXED INSTRUMENTAL
C5 DISCRIMINATION, OPERANT
C6 DISCRIMINATION, REVERSAL
C7 DISCRIMINATION, SIMULTANEOUS
C8 DISCRIMINATION, TRANSFER
C9 DISCRIMINATION, OTHER

D0 DRIVE, GENERAL
D1 DRIVE, ACTIVITY
D2 DRIVE, EXPLORATORY
D3 DRIVE, HUNGER
D4 DRIVE, IRRELEVANT
D5 DRIVE, LEARNED
D6 DRIVE, PAIN
D7 DRIVE, THIRST
D8 DRIVE, SEX
D9 DRIVE, OTHER

E0 GENERALIZATION, GENERAL
E1 GENERALIZATION, STIMULUS
E2 GENERALIZATION, LEARNED
E3 GENERALIZATION, RESPONSE
E4 GENERALIZATION, TRANSFER
E5 GENERALIZATION, INCENTIVE
E6
E7
E8
E9 GENERALIZATION, OTHER

F0 INHIBITION, GENERAL
F1 INHIBITION, CONDITIONED
F2 INHIBITION, DISINHIBITION
F3 INHIBITION, EXTERNAL
F4 INHIBITION, TEMPORARY (S OR R)
F5 INHIBITION, RETROACTIVE OR PROACTIVE
F6 INHIBITION, RESP. SUPPRESSION
F7
F8
F9 INHIBITION, OTHER

G0 INTERVAL, INTER-STIMULUS
G1 INTERVAL, INTER-TRIAL
G2 INTERVAL, INTER-SESSION
G3 INTERVAL, RETENTION
G4 INTERVAL, INTER-RESPONSE
G5 INTERVAL, INTRA-SESSION
G6 INTERVAL, STIMULUS-RESPONSE
G7
G8
G9

H0 LEARNING, LATENT
H1 LEARNING, SPATIAL
H2 LEARNING, PROBABILITY
H3 LEARNING, VTE
H4 LEARNING, INCIDENTAL
H5 LEARNING, OBSERVATIONAL
H6 LEARNING, NUMBER OF TRIALS
H7 LEARNING, ALTERNATION ETC.
H8 LEARNING, RELEARNING
H9 LEARNING, OTHER

I0 PUNISHMENT, GENERAL
I1 PUNISHMENT, INTENSITY
I2 PUNISHMENT, CHANGE-EXTINCTION
I3 PUNISHMENT, CHANGE-OTHER
I4 PUNISHMENT, DELAY
I5 PUNISHMENT, LEARNED-SECONDARY
I6 PUNISHMENT, PATTERN
I7 PUNISHMENT, QUALITY
I8 PUNISHMENT, CORRELATED
I9 PUNISHMENT, VARIED

J0 REINFORCEMENT, GENERAL
J1 REINFORCEMENT, AMOUNT
J2 REINFORCEMENT, CHANGE-EXTINCTION
J3 REINFORCEMENT, CHANGE-OTHER
J4 REINFORCEMENT, DELAY
J5 REINFORCEMENT, LEARNED-SECONDARY
J6 REINFORCEMENT, PATTERN
J7 REINFORCEMENT, QUALITY
J8 REINFORCEMENT, CORRELATED
J9 REINFORCEMENT, VARIED

K0 RESPONSE, GENERAL
K1 RESPONSE, ANTICIPATORY
K2 RESPONSE, CHAINED
K3 RESPONSE, CONSUMMATORY
K4 RESPONSE, CONDITIONED
K5 RESPONSE, DELAYED
K6 RESPONSE, OBSERVING
K7 RESPONSE, VARIABILITY
K8 RESPONSE, UNCONDITIONED
K9 RESPONSE, OTHER

L0 STIMULUS, GENERAL
L1 STIMULUS, ADAPTATION
L2 STIMULUS, CONDITIONED
L3 STIMULUS, COMPOUND/COMPLEX
L4 STIMULUS, FEEDBACK
L5 STIMULUS, INTENSITY
L6 STIMULUS, UNCONDITIONED
L7 STIMULUS, DURATION
L8 STIMULUS, PROBABILITY
L9 STIMULUS, OTHER

M0 CONFLICT, GENERAL
M1 CONFLICT, FRUSTRATION-AGGRESSION
M2 CONFLICT, FAILURE
M3 CONFLICT, EXPER. NEUROSIS
M4 CONFLICT, FIXATION
M5 CONFLICT, STRESS
M6 CONFLICT, EMOTIONALITY
M7
M8
M9

N0 BRAIN, LESIONS
N1 BRAIN, STIMULATION
N2 E.C.S., ETC.
N3 DRUGS, ANIMAL
N4 DIET
N5 PHYSIOLOGICAL MEASURES
N6 COMPARATIVE (SPECIES)
N7 COMPARATIVE (AGE)
N8 RADIATION
N9

O0 INSTRUCTIONS
O1 KNOWLEDGE OF RESULTS
O2
O3 IMITATION-COOPERATION
O4 MATCHING TO SAMPLE
O5 REACTION TO TIME
O6 READY SIGNAL
O7
O8
O9

P0 CONTRAST
P1 DIFFICULTY
P2 EFFORT
P3 PRETRAINING
P4 SPONTANEOUS RECOVERY
P5 ENVIRONMENTAL CONDITIONS
P6
P7
P8
P9

S 0047

Q0 IMPRINTING
Q1 EARLY ISOLATION
Q2 REARING CONDITIONS
Q3 STIMULUS EXPOSURE
Q4 PRENATAL
Q5 INFANCY
Q6 CHILDHOOD
Q7 SENSORY/MOTOR DEVELOPMENT
Q8 LANGUAGE DEVELOPMENT
Q9 INTELLECTUAL DEVELOPMENT

R0 PREFERENCE, ANY RESPONSE
R1 PREFERENCE, ANY STIMULUS
R2 PREFERENCE, REINFORCEMENT SCHEDULES
R3 PREFERENCE, FOOD/WATER
R4
R5
R6
R7
R8
R9

S0 PSYCHOPHYSICS
S1 THRESHOLD/SIGNAL
S2 ADAPTATION
S3 EXCITATORY DETECTION
S4 PSYCHOPHYSIOLOGY
S5 CUTANEOUS
S6 OLFACTORY
S7 TASTE
S8 PROPRIOCEPTION, ETC.
S9

T0 PERCEPTION, OBJECTIVE
T1 PERCEPTION, FORM
T2 COLOR CONSTANCY
T3 BRIGHTNESS CONSTANCY
T4 SIZE CONSTANCY
T5 DISTANCE PERCEPTION
T6 AUDITORY PERCEPTION
T7 SPAN OF APPREHENSION
T8 PERCEPTION OF MOTION
T9 PERCEPTION, GENERAL

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                                                                DATE 12/09/7

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JCPP61-54/ 56 ARMUS.H.L.GARLICH           SEC REINF F SCHED PRIMARY REINF
PS   66- 4/175 ARMUS.H.L.SNIADOWSKI       STARTLE DEC AND SEC REINF STIM
PRP 62-11/203 ARMUS.H.L.ETAL              EFFECT PRIMARY REINF SCHED ON SEC REINF
PRP 64-14/535 ARMUS.H.L.ETAL              SEC REINF STIM ON AUDITORY STARTLE RESP
JCPP64-57/313 ARMUS.H.L.ETAL              SEC REINF STRENGTH, PRIMARY REINF SCHED
AJP 60-73/454 BADDELEY.A.D.               POSITION HABIT WITH SEC REINF FOR WRONG
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PRV 56-63/406 BARLOW.J.A.                 SEC MOTIVATION THRU CLASSICAL COND
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AJP 53-66/456 BITTERMAN.M.E..ETAL         SEC REINF AND DISCRIM HYPOTHESIS
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JCPP56-49/254 BROWN.J.L.                  EFFECT DRIVE ON LEARNING WITH SEC REINF
JEP 42-30/326 BROGDEN.W.J.                NON-ALIMENTARY COMPONENTS IN FOOD REINF
JGTP57-90/ 89 BROWN.W.L.HALAS             TERMINAL EXTINCTION MULT-T-MAZE
JCPP58-51/355 BUCHANAN.G.N.               PUNISHMENT-ESCAPE EVENTS ON CHOICE
PRP 63-13/855 CHAPMAN.R.F.CARLSON         EFFECT NUMBER OF CUES ON LATENT EXTINCT
JCP 38-26/121 BUGELSKI.R.                 EXTINCTION WITH AND WITHOUT SUBGOAL REI
JCPP58-51/346 BUTTER.C.M.THOMAS           SEC REINF F AMOUNT PRIMARY REINF
PRP 56- 2/377 CLAYTON.F.L.                SEC REINF F REINF SCHEDULING
PRP 62-10/231 CLAYTON.F.L.                CUE STRENGTH OF S AND COND REINF VALUE
PRP 60- 6/ 39 CLAYTON.F.L.SAVIN           SEC REINF AFTER CRF AND VR PRIMARY REINF
WILEY 1964    COFER.C.N.APPLEY            MOTIVATION THEORY AND RESEARCH (474.563)
JCPP54-47/109 COPPOCK.H.W.                S PRECEDING SHOCK ACQUIRE POS REINF PROP
CPM 37-14/ 96 COWLES.J.T.                 FOOD TOKENS FOR LEARNING BY CHIMP
JP   59-48/299 CROWDER.W.F.ETAL           SEC REINF OR RESP FACIL - RESIST EXT
JP   59-48/303 CROWDER.W.F.ETAL           SEC REINF OR RESP FACIL - RESP ACQ
JP   59-48/307 CROWDER.W.F.ETAL           SEC REINF OR RESP FACIL - RECONDITIONING
JP   59-48/311 CROWDER.W.F.ETAL           SEC REINF OR RESP FACIL - RETENTION
AP   53- 8/338 D'AMATO.M.R.               DRIVE SHIFT AND SEC REINF
JCPP55-48/378 D'AMATO.M.R.                SEC REINF AND MAG PRIMARY REINF
JCP 55-49/352 D'AMATO.M.R.                TRANSFER SEC REINF ACROSS HUNGER/THIRST
JCPP58-51/737 D'AMATO.M.R.LACHMAN         SEC REINF, REWARD SCHEDULE, TESTING SIT
PS   66- 6/417 DAVENPORT.D.G.SARDELLO     DOUBLE INTERMITTENT REWARD AND SEC REINF
JEAB67-10/271 DE LORGE.J.                 FI BEHAVIOR MAINTAINED BY COND REINF
JEP 46-36/373 DENNY.M.R.                  SEC REINF IN PARTIAL REINF SITUATION
JEP 48-38/245 DENNY.M.R.                  DIFF END BOXED IN SIMPLE T-MAZE LEARNING
JEP 50-40/458 DINSMOOR.J.A.               COMPARE DISCRIM AND REINF FUNCTIONS OF S
JCPP52-45/ 31 DINSMOOR.J.A.               REST EXT AFTER PR WITH DISCRIM STIMULUS
JEAB63- 6/ 75 DINSMOOR.J.A.CLAYTON        CHAINING AND SEC REINF BASED ON SHOCK
JEAB66- 9/547 DINSMOOR.J.A.CLAYTON        COND REINF, TEMPORAL ASSOC TERM SHOCK
JGTP53-48/ 57 DINSMOOR.J.A.ETAL           EFFECT OF REGULAR AND PERIODIC SEC REINF
JEP 62-64/ 97 EGGER.M.D.MILLER            SEC REINF FUNCTION INFORMATION VALUE
JCPP63-56/132 EGGER.M.D.MILLER            EXPER STUDY OF INFORMATION HYPOTHESIS
AP   48-37/241 EHRENFREUND.D.             PARTIAL REINF ON STRENGTH OF SEC REINF
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JCPP49-42/  1 EHRENFREUND,D.                SEC REINF IN BLACK-WHITE DISCRIMINATION
JCPP54-47/311 EHRENFREUND,D.                GENERALIZATION OF SEC REINF IN DISCRIM
JCPP53-46/176 CALVIN,J.S.ETAL               EFFECT SEC REINF ON CONSUMMATORY BEHAVIOR
JCPP51-44/246 HALL,J.F.                     SEC REINF AND FREQUENCY OF PRIMARY REINF
JCPP51-44/462 HALL,J.F.                     SEC REINF AND DRIVE DURING PRIMARY REINF
PS  67- 7/241 HENDRY,D.P.COULBOURN          REINF BY INFORM S NOT POS DISCRIM S
JCPP57-50/339 HENDERSON,R.L.                STIM INTENSITY DYNAMISM AND SEC REINF
JEAB64- 7/ 27 HERRNSTEIN,R.J.               SEC REINF AND RATE OF PRIMARY REINF
PRP 60- 6/ 71 HODGE,C.C.CROWDER             SEC REINF AND INTER-PAIRING INTERVAL
JEP 55-50/339 HOPKINS,C.O.                  SEC REINF AND QUANTITY AND QUALITY FOOD
PS  67- 8/179 HUGHES,H.ADAMS                TERMINATION SHOCK AS SEC REINF
PRC 60-10/ 29 HULICKA,I.M.CAPEHART          IS THE CLICK A SEC REINFORCER
JEP 56-52/221 HULSE,S.H.STANLEY             EXTINCT RELATED TO PARTIAL AND SEC REINF
JAPP64- 6/ 29 IKEDA,S.                      SEC REINF OF PHYSICAL BLOCKING
AANP62-12/ 93 IWAMOTO,T.                    SEC AND PARTIAL REINF ON REACTIVITY
JGTP54-85/129 JAMES,W.T.                    SEC REINF IN OPERANT SITUATION WITH DOGS
AJP 50-63/237 JENKINS,W.O.                  TEMPORAL GRADIENT OF DERIVED REINF
PS  66- 6/183 KASS,N.ETAL                   SCHEDULES OF TRAINING AND COND REINF
JCPP62-55/ 22 KEEHN,J.D.                    POST-STIM CONDITIONS ON SEC REINF
PRP 60- 7/531 KANFER,F.H.                   INCENTIVE VALUE OF GENERALIZED REINFORCER
JEP 59-58/400 KANFER,F.H.MATARAZZO          SEC AND GENERALIZED REINF IN HUMAN LRNG
SC  56-24/679 KELLEHER,R.T.                 INTERMITTEND COND REINF IN CHIMP
PRP 57- 3/485 KELLEHER,R.T.                 MULT SCHEDULE COND REINF WITH CHIMP
JCPP57-50/571 KELLEHER,R.T.                 COND REINF IN CHIMP
JEAB58- 1/281 KELLEHER,R.T.                 FR SCHEDULES OF COND REINF WITH CHIMP
JEAB61- 4/  1 KELLEHER,R.T.                 SCHEDULES OF COND REINF DURING EXTINCTION
APPLETON 1966 KELLEHER,R.T.                 CHAINING/COND REINF (HONIG.OPERANT.160)
JEAB66- 9/475 KELLEHER,R.T.                 COND REINF IN SECOND-ORDER SCHEDULES
JEAB62- 5/167 KELLEHER,R.T.FRY              STIMULUS FUNCTIONS IN CHAINED FI SCHEDULE
JEAB62- 5/543 KELLEHER,R.T.GOLLUB           REVIEW POSITIVE COND REINF
JCP 43-36/ 67 KENDLER,H.H.                  INFLUENCE OF SUB-GOAL ON MAZE BEHAVIOR
JEAB65- 8/227 KIEFFER,J.D.                  DIFF R RATES AND PRESENCE OF NEUTRAL S
APPLETON 1961 KIMBLE,G.A.                   CONDITIONING AND LEARNING (167)
JEP 59-58/423 KLEIN,R.M.                    INTERMITTENT PRIMARY REINF AND SEC REINF
JCPP66-61/151 KNOTT,P.D.CLAYTON             DURABLE SEC REINF USING BRAIN STIMULATION
JEP 53-45/321 LAMBERT,W.W.ETAL              ACQ AND EXT IN TOKEN-REWARD SITUATION
JCPP64-58/374 LANDAUER,T.K.                 DELAY OF AN ACQUIRED REINFORCER
JCPP61-54/552 LAWRENCE,D.H.HOMMEL           DIFF GB ON DISCRIM LRNG WITH DELAYED SR
QJEP65-17/ 57 LAWLER,E.E.                   SEC REINF S ASSOCIATED WITH SHOCK REDUCT
JEP 53-46/183 LAWSON,R.                     AMT PRIMARY REWARD AND STRENGTH SEC REINF
JCPP57-50/ 35 LAWSON,R.                     DISCRIM AND SEC REINF AS F PRIMARY REWARD
JCPP58-51/742 LAWSON,R.MARX                 COMPARE FRUSTRATING AND SEC REINF OPS
CD  61-32/349 LEIMAN,A.H.ETAL               SEC REINF IN DISCRIM WITH CHILDREN
AJP 60-73/440 ELAM,C.B.TYLER                SEC REINF IN NEW LEARNING SITUATIONS
JCPP54-47/381 ELAM,C.B.ETAL                 SEC REINF AND DISCRIM HYPOTHESIS
JCP 37-24/504 ELLSON,D.G.                   TOKEN REWARD HABIT IN DOGS
JEP 48-38/173 ESTES,W.K.                    EFFECT COND STIM ON OPERANT RESPONSE
JEP 49-39/306 ESTES,W.K.                    MOTIVATING COND NECESSARY FOR SEC REINF
JCPP49-42/286 ESTES,W.K.                    GENERALIZATION SEC REINF FROM PRIMARY D
PRP 67-20/335 MALAGODI,E.F.                 TOKEN REWARD HABIT IN THE RAT
PS  66- 4/357 MORNINGSTAR,M.ETAL            STIM DURATION ON SEC REINF
JEAB62- 5/335 EVANS,W.O.                    POS/NEG TEND TO S ASSOCIATED WITH SHOCK
JEP 51-42/442 FERSTER,C.B.                  EXTINCTION WITH STIM CONT PRESENT IN ACQ
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CD  61-32/766 FORT,J.G.                 SEC REINF WITH PRESCHOOL CHILDREN
JCPP61-54/206 FOX,R.E.KING              REINF SCHEDULE ON STRENGTH SEC REINF
JEP 57-53/361 FREIDES,D.                GOALBOX CUES AND APTTERN OF REINF
JCPP58-51/265 GILBERT,T.F.STURDIVANT    FOOD-ASSOCIATED S ON LOCOMOTOR BEHAVIOR
AJMD62-67/441 GIRARDEAU,F.L.            SEC REINF ON MENTAL DEFECTIVES
BJP 29-30/173 GRINDLEY,G.C.             AMOUNT OF REWARD ON LEARNING IN CHICK
JEP 48-38/  1 GRICE,G.R.                SEC REINF AND DELAYED REWARD IN DISCRIM
JEP 58-50/147 GRICE,G.R.GOLDMAN         GENERALIZED EXTINCTION AND SEC REINF
JGTP57-91/ 83 LEVY,G.W.BEVAN            BAR PRESSING UNDER FI AND CONT SEC REINF
JCPP57-50/ 29 LEVY,N.                   SECONDARY INHIBITION AND SEC REINF
PS  66- 6/ 47 LEVIN,S.M.STERNER         POSITIVE SEC REINF IN HUMAN SUBJECTS
JGTP61-98/ 49 LEWIS,G.W.MICHELS         SEC REINF AND QUALITY OF FOOD REWARD
PRP 65-16/557 LEWIS,M.                  EFFORT ON CHOICE - VALUE OF SEC REINF
PS  66- 4/425 LONGSTRETH,L.E.           FRUSTRATION RATHER THAN SEC REINF CHILD
PB  67-67/197 LOTT,D.F.                 SEC REINF AND FRUSTRATION
JEAB60- 3/289 MABRY,J.                  COND REINF IN ANIMAL EXPERIMETER INTERACT
PS  67- 8/469 MALAGODI,E.F.             FR SCHEDULES OF TOKEN REINFORCEMENT
JCPP61-54/207 MARX,M.H.MURPHY           EXTINCTION WITH MOTIVATING CUE IN START
JCPP57-50/264 MASON,D.J.                RELATION SEC REINF TO PARTIAL REINF
AP  52- 7/274 MACCASLIN,E.F.ETAL        SEC REINF AND PARTIAL REINF
JCPP49-42/383 MACCORQUODALE,K.MEEHL     COGNITIVE LEARNING WITHOUT COMPETITION
JCPP53-46/ 80 MCCLELLAND,D.C.MCGOWN     VARIABLE FOOD REINF ON STRENGTH SEC REINF
PRP 61- 8/325 MCCRYSTAL,T.J.CLARK       EXTINCTION AND SCHEDULE OF SEC REINF
JEP 58-55/184 MCGUIGAN,F.J.CROCKETT     SEC REINF S MUST BE DISCRIMINATED
JCPP54-47/370 MELCHING,W.H.             INTERMITTENTLY PRESENTED NEUTRAL S
JCPP64-58/350 MELVIN,K.B.BROWN          NEUTRALIZATION AVERSIVE S BY PAIR FOOD
INAS57-67/297 MICHELS,K.M.LEWIS         SEC REINF AND QUALITY OF FOOD REWARD
WILEY 1951    MILLER,N.E.               LEARNABLE DRIVE/REWARD (STEVENS HDBK,435
AP  61-16/739 MILLER,N.E.               ANALYTICAL STUDIES OF DRIVE AND REWARD
JCPP56-49/126 MILES,R.C.                SEC REINF AND DEPRIVATION AND HABIT
JCPP56-49/496 MILES,R.C.                SEC REINF THRU SPONTANEOUS RECOVERY
JCPP53-46/ 77 MILES,R.C.WICKENS         SEC REINF ON PRIMARY HUNGER DRIVE
PS  66- 4/115 MCKEEVER,B.FORRIN         SEC REINF AND INFORMATION VALUE
PRP 65-16/163 MOGENSON,G.J.             SEC REINF AND REWARDING BRAIN STIMULATIO
JEP 53-49/395 MOLTZ,H.                  LATENT EXTINCTION AND SEC REINF
PRP 63-12/683 MCNAMARA,H.J.             DRIVE AND DISCRIM ON R WITHOUT PRIMARY S
PS  65- 2/ 61 MORROW,J.E.ETAL           DEPENDENCE OF REINF AND DISCRIM F OF S
PRP 62-11/801 MCNAMARA,H.J.PAIGE        ELABORATION OF DURABLE SECONDARY REINF
JEP 42-31/ 57 MOTE,F.A.FINGER           EXPLORATORY D AND SEC REINF ON RUNNING
JCPP50-43/148 MOWRER,O.H.               COMMENT ON ESTES (GENERALIZATION SEC REI
PB  58-55/284 MYERS,J.L.                SEC REINF ... REVIEW RECENT EXPERIMENTS
JEP 66-72/627 MYERS,J.L.MYERS           SEC REINF IN CHILDREN
JEP 60-60/172 MYERS,N.A.                PARTIAL AND CONT SEC REINF ON EXTINCTION
JEP 62-64/586 MYERS,N.A.MYERS           SEC REINF SCHEDULES IN EXTINCTION
JEP 65-70/ 98 MYERS,N.A.MYERS           DISCRIM HYPOTHESIS OF SEC REINF
CD  61-32/765 MYERS,N.A.ETAL            SEC REINF AS F NUMBER REINF TRIALS
PS  66- 5/321 MYERS,W.A.TRAPOLD         STRENGTH OF GENERALIZED SEC REINF
JEP 57-53/184 NEFZGER,M.D.              S ASSOCIATED WITH SHOCK REDUCTION
JCPP64-58/367 NEVEN,J.A.                COND REINF IN CHAINING SITUATION
PS  66- 5/191 NEVEN,J.A.                GENERALIZED COND REINF IN SATIATED RATS
JEP 51-41/161 NOTTERMAN,J.M.            APERIODIC REINF, DISCRIM AND SEC REINF
JEP 53-46/232 OLDS,J.                   PRACTICE ON SECONDARY APPROACH DRIVES
PRP 63-13/679 PAIGE,A.B.MCNAMARA        SEC REINF AND DISCRIM HYPOTHESIS
JEP 47-37/377 PERKINS,C.C.              RELATION SEC REWARD TO GRADIENTS OF REI
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PRP 66-1[illegible]/[illegible]	PILLEY.J.W.LORING	ALTERED GOAL BOX CUES ON PRF
PRP 64-1[illegible]/ 11	PLATT.J.R.WINE	FOOD REINF FOR [illegible] RAT
PRP 63-1[illegible]/[illegible]	PLATT.[illegible]	[illegible] SEC REINF
JEAB65- [illegible]/[illegible]	PLISKOFF.S.S.[illegible]	SIGN REVERSAL OF COND REINF
PRP 64-14/17[illegible]	PLISKOFF.S.S.ETAL	DISCRIM HYPOTHESIS AND REWARDING [illegible]
JEP 57-5[illegible]/[illegible]	POWELL.D.R.PERKINS	SEC REINF AND DURATION OF GOAL RESP
PRP 6[illegible]- [illegible]/[illegible]	RATNER.S.C.	REINF AND DISCRIM PROPERTIES OF CLICK
PRV [illegible]/[illegible]	RAZRAN.G.	SECOND-ORDER COND AND SEC REINF
JCPP64-57/[illegible]	REID.L.S.SLIVINSKE	GENERALIZED SEC REINF DURING EXTINCTION
JCPP65-60/1[illegible]1	RENNER.K.E.	GOAL BOX CUES ON TEMPORAL GRADIENT REINF
JEP 63-66/ [illegible]	REYNOLDS.G.S.	ON SOME DETERMINANTS OF CHOICE
PRP 61- [illegible]/348	REYNOLDS.W.F.ETAL	SEC REINF IN T-MAZE AFTER DIRECT PLACEMT
JEP 6[illegible]-6[illegible]/ [illegible]	REYNOLDS.W.F.ETAL	SEC REINF AS F METHOD OF TESTING
PRP 63-12/776	REYNOLDS.W.F.ETAL	MAZE LRNG BY SEC REINF WITHOUT DISCRIM TR
PRP 64-15/ 7	REYNOLDS.W.F.ETAL	SEC REINF AS F REWARD MAGNITUDE
JEP 61-61/[illegible]	ROBERTS.C.L.ETAL	SEC REINF BASED ON STIMULUS-CHANGE
JCPP49-42/161	SALTZMAN.I.J.	MAZE LRNG IN ABSENCE OF PRIMARY REINF
JEP 50-40/189	SALTZMAN.I.J.	GENERALIZATION OF SEC REINF
JEP 56-51/139	SCHRODER.H.M.	DEVEL AND MAINT OF PREFERENCE VALUE
JCPP56-49/149	SCHLOSBERG.H.PRATT	SEC REWARD VALUE OF INACCESSIBLE FOOD
JEP 50-40/ 40	SCHOENFELD.W.N.ETAL	TRAINING COND NECESSARY FOR SEC REINF
AUDP66-18/ 57	SEGAL.B.CHAMPION	PROPERTIES OF S ASSOCIATED WITH FOOD DEP
PS 64- 1/175	SEGAL.E.F.	SERIAL COND REINF IN MULT-CHAIN SCHEDULE
PS 65- 2/135	SEGAL.E.F.	CONDITIONED REINFORCEMENT
PS 65- 2/137	SEGAL.E.F.	COND REINF PAIRED WITH FOOD AND SHOCK
PRV 50-57/262	SEWARD.J.P.	SEC REINF AS TERTIARY MOTIVATION
JCPP53-46/334	SEWARD.J.P.LEVY	CHOICE-POINT BE AS F SEC REINF
JCPP51-44/ 67	SIMON.C.W.ETAL	SEC REINF ON PRIMARY THIRST DRIVE
JGNP36-14/263	SKINNER.B.F.	REINF EFFECT OF DIFFERENTIATING STIMULUS
JGNP39-20/475	SMITH.M.F.	TOKEN REWARD HABIT IN THE CAT
JEP 54-48/123	SMITH.M.P.BUCHANAN	SEC REINF BY CUES ASSOCIATED WITH SHOCK
PRV 47-54/ 1	SPENCE.K.W.	SEC REINF IN DELAYED REWARD LEARNING
JEP 64-67/573	SPERLING.S.E.VALLE	HANDLING-GENTLING AS POSITIVE SEC REINF
JEAB62- 5/505	STEVENSON.J.G.REESE	TWO SCHEDULES OF PRIMARY AND COND REINF
SC 58-27/466	STEIN.L.	SEC REINF ESTABLISHED WITH ESB
JCPP59-52/721	STEBBINS.W.C.	AMOUNT PRIMARY REINF ON DISCRIM/SEC REINF
PRC 66-16/457	STEINMAN.W.M.	GENERALIZED COND REINF
PS 67- 8/299	STUBBS.A.	COMPETITIVE COND REINF AND EFFICIENT DRL
SC 63-41/172	THOMAS.D.R.WILLIAMS	STIM GENERALZATION OF POSITIVE COND REINF
JEP 64-68/402	THOMAS.D.R.CARONITE	DISCRIM TRAINING ON STIM GEN OF COND REIN
JEP 66-72/260	THOMAS.D.R.DEROSA	GENERALIZATION OF REINF AND DISCRIM STIM
AJP 56-69/359	TYLER.D.W.	EXTINCTION WITH CONTROL SEC REINF
PRP 64-15/883	VACHER.J.M.SHAFER	SEC REINF AND STIMULUS CHANGE
PRP 64-14/403	VINEY.W.ETAL	RANDOMIZED INTERMITTENT STIM ON EXTINCTIC
PS 64- 1/363	WAGMAN.W.ALLEN	COND POS REINF BASED ON TERM OF SHOCK
JEP 42-31/312	WALKER.K.C.	DISCRIM S TRANSFERRED TO UNASSOCIATED R
JCPP62-55/016	WEISS.S.J.LAWSON	SEC REINF SUPPRESSOR OF RATE OF OPERANT
JCPP53-46/180	WEBB.W.B.NOLAN	CUES FOR DISCRIM AS SEC REINF
PRP 65-16/242	WENRICH.W.W.CAHOON	SEC REINF USING DISCRIM S FROM AVERSIVE
PS 65- 3/343	WENRICH.W.W.ETAL	POS REINF BY DISCRIM STIM IN AVERSIVE
HARPER 1966	WIKE.E.L.	SECONDARY REINFORCEMENT
JCPP54-47/240	WIKE.E.L.CASEY	SEC REINF VALUE OF FOOD FOR THIRSTY RAT
JCPP54-47/441	WIKE.E.L.CASEY	SEC REWARD VALUE OF FOOD SATIATED RATS

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PRP 55- 1/ 83 WIKE.E.L.MCNAMARA       QUEST FOR GENERALIZED COND REIN
JCPP57-50/345 WIKE.E.L.MCNAMARA       SOME TRAINING COND AFFECTING SEC
JCPP58-51/640 WIEK.E.L.BARRIENTOS     SEC REINF AND MULTIPLE DRIVE
JCPP62-55/020 WIKE.E.L.FARROW         DRIVE INTENSITY ON SEC REINF
PRP 62-12/273 WIKE.E.L.PLATT          REINF SCHEDULES AND BAR PRESSING
PRP 62-12/397 WIKE.E.L.ETAL           REWARD VALUE OF GETTING OUT OF START BOX
PRP 63-13/ 45 WIKE.E.L.ETAL           DRIVE AND SEC REINF
JP  60-49/ 83 WIKES.W.P.CROWDER       SEC REINF CONTROL FOR R FACILITATION
UCPP29- 4/ 31 WILLIAMS.K.A.           REWARD VALUE OF A CONDITIONED STIMULUS
CPM 36-12/ 60 WOLFE.J.B.              EFFECTIVENESS OF TOKEN REWARDS FOR CHIMP
JEP 61-62/409 WUNDERLICH.R.A.         GENERALIZED SEC REINF AS F VARIABILITY SP
PRV 59-66/ 68 WYCKOFF.L.B.            QUANTITATIVE THEORY OF SEC REINF
JCPP58-51/103 WYKOFF.L.B.ETAL         SEC REINF AND CUE EFFECTS OF STIMULUS
PRV 57-64/373 ZIMMERMAN.D.W.          DURABLE SEC REINF ... METHOD AND THEORY
JCPP59-52/353 ZIMMERMAN.D.W.          SUSTAINED PERF BASED ON SEC REINF
JGTP61-99/139 ZIMMERMAN.D.W.          DEPRIVATION AND SATIATION ON SEC REINF
PRP 63-12/466 ZIMMERMAN.D.W.          COMMENT ON MCNAMARA AND PAIGE
PRP 63-13/135 ZIMMERMAN.D.W.          THREE S COND ON STRENGTH OF SEC REINF
PRP 63-13/747 ZIMMERMAN.D.W.          CONDITIONS AT TIME OF REINF ON SEC REINF

CERLER68        JVLB68- 7/847 CEREWICKI.L.F.ETAL        1
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                                                                    DATE 12/[illegible]

LITERATURE OF LEARNING ... OPERATIONAL ANALYSIS (REFERENCE CODE)
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X0000.0000000 BASIC OPERATION
 A             OMISSION OF SOME EVENT CONTINGENT ON FREELY AVAILABLE RESPONSE.
 B             OMISSION OF SOME EVENT CONTINGENT ON PERIODICALLY ENABLED RESPONSE
 C             SS...PAIRED PRESENTATION OF STIMULI INDEPENDENT OF BEHAVIOR.
 H             RIRX...IRX CONTINGENCY DEPENDENT ON NATURE OF RESPONSE.
 I             IRX...CONTINGENCY OF SOME EVENT ON PERIODICALLY ENABLED RESPONSE.
 J             SIRX...IRX CONTINGENCY DEPENDENT ON PRESENCE OF A STIMULUS.
 N             RORX...ORX CONTINGENCY DEPENDENT ON NATURE OF RESPONSE.
 O             ORX...CONTINGENCY OF SOME EVENT ON A FREELY AVAILABLE RESPONSE.
 P             SORX...ORX CONTINGENCY DEPENDENT ON PRESENCE OF A STIMULUS.
 Q             RR...ELICITATION, FORCING OR PUTTING THROUGH OF TWO RESPONSES.
 R             ELICITATION, FORCING OR PUTTING THROUGH OF A RESPONSE.
 S             PRESENTATION OF A STIMULUS INDEPENDENT OF BEHAVIOR.
 W             OBSERVATION OF SPECIFIED BEHAVIORS WHEN ENABLED.
 X             CONTINUOUS OBSERVATION OF SPECIFIED BEHAVIORS OVER TIME.
 Y             OBSERVATION OF SPECIFIED BEHAVIORS CONTINGENT ON OTHER RESPONSE.
 Z             OBSERVATION OF SPECIFIED BEHAVIORS CONTINGENT ON STIMULATION.

0X000.0000000 SECOND OPERATION
 0             NO SECOND OPERATION.
               SIMULTANEOUS MIX, BASIC OPERATION.
               INTERSPERSED MIX, BASIC OPERATION.
 LETTER        BASIC OPERATION FOLLOWED BY INDICATED OPERATION.
00X00.0000000 NATURE OF ANTECEDENT STIMULI
  A            SA...ONSET OF AVERSIVE EVENT.
  B            -SA...OFFSET OF AVERSIVE EVENT.
  C            ONSET OF STIMULUS PREVIOUSLY PAIRED WITH AVERSIVE EVENT.
  D            OFFSET OF STIMULUS PREVIOUSLY PAIRED WITH AVERSIVE EVENT.
  H            STIMULUS FOR A RESPONSE COMPATIBLE WITH DESIGNATED RESPONSE.
  I            STIMULUS FOR A RESPONSE INCOMPATIBLE WITH DESIGNATED RESPONSE.
  J            CONFIRMING STIMULUS.
  K            KNOWLEDGE OF RESULTS.
  N            OFFSET OF STIMULUS PREVIOUSLY PAIRED WITH REINFORCING EVENT.
  M            ONSET OF STIMULUS PREVIOUSLY PAIRED WITH REINFORCING EVENT.
  O            PUTATIVE OR INDETERMINANT STIMULUS.
  Q            -SR...OFFSET OF PRIMARY REINFORCING STIMULUS.
  R            SR...ONSET OF PRIMARY REINFORCING STIMULUS.
  S            ONSET OF NEUTRAL STIMULUS.
  T            -S...OFFSET OF NEUTRAL STIMULUS.
000X0.0000000 NATURE OF THE RESPONSE.
   A           RESPONSE DEFINED BY EFFECT ON MANIPULANDUM.
   F           FIXED ACTION PATTERN.
   L           LOCOMOTION, TAXIS.
   M           MOVEMENT OF PART OF ORGANISM INDEPENDENT OF ENVIRONMENT.
   O           PUTATIVE OR INDETERMINANT RESPONSE.
   R           LOCOMOTOR RESPONSE DEFINED BY SPATIAL ORIENTATION.
   S           GLANDULAR SECRETION.
   V           VERBAL RESPONSE.
   X           REFLEX RESPONSE.
0000X.0000000 NATURE OF SUBSEQUENT STIMULUS.
               SAME AS COLUMN 3.
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                                                         DATE 12/03/7

          OPERATION SUB-ANALYSIS ... AVERSIVE CONTROL
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 X---  NEUTRAL STIMULUS SCHEDULE
 0 - NONE
 1 - UNCORRELATED
 2 - PARTIALLY CORRELATED
 3 - PERFECTLY CORRELATED
 4 - MORE THAN ONE

  X--  AVERSIVE CONDITIONS/SCHEDULE
 0 - FIXED/OMISSION DEPENDENT
 1 - FIXED/ON INDEP, OFF INDEP
 2 - FIXED/ON INDEP, OFF DEP
 3 - FIXED/ON DEP, OFF INDEP
 4 - FIXED/ON DEP,OFF DEP
 5 - CORRELATEDOON INDEP,OFF INDEP
 6 - CORRELATED/ON INDEP,OFF DEP
 7 - CORRELATED/ON DEP, OFF INDEP
 8 - CORRELATED/ON DEP,OFF DEP

   X-  BASELINE BEHAVIOR
 0 - UNCONTROLLED
 1 - SIMPLEB CLASSICAL-APPETITIVE
 2 - SIMPLE, CLASSICAL-AVERSIVE
 3 - SIMPLE, OPERANT-APPETITIVE
 4 - SIMPLE, OPERANT-AVERSIVE
 5 - SIMPLE, INSTRUMENTAL-APPETITIVE
 6 - SIMPLE, INSTRUMENTAL-AVERSIVE
 7 - DIFFERENTIAL, CLASSICAL
 8 - DIFFERENTAIL, OPERANT
 9 - DIFFERENTIAL, INSTRUMENTAL

    X  PROBE OPERATIONS
 0 - CONCURRENT, ACQUISITION
 1 - CONCURRENT, BASELINE
 2 - CONCURRENT, EXTINCTION
 4 - 3 - CONCURRENT, RETENTION
 4 - CONCURRENT, GENERALIZATION
 5 - SUBSEQUENT, ACQUISITION
 6 - SUBSEQUENT, BASELINE
 7 - SUBSEQUENT, EXTINCTION
 8 - SUBSEQUENT, RETENTION
 9 - SUBSEQUENT, GENERALIZATION
```

GENERAL OUTLINE OF OPERATION-ANALYSIS SYSTEM

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Knoxville
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MANUAL OF OPERATIONAL ANALYSIS

1.0 Reference

1.11 The reference should be complete, legible, and in standard APA form.

1.12 If the paper reports more than one experiment, indicate beneath the reference the designation of the experiment as it is identified in the paper, and the total number of experiments reported in the paper.

Example: Rescorla, R.A. & Skucy, J.A. Effect of response independent reinforcers during extinction. Journal of Comparative and Physiological Psychology, 1969, 67, 381-389.

Experiment one of four

A separate analysis sheet should be used for each experiment, but each sheet need not include (repeat) the operations common to all the experiments; cross reference to the sheet on which the common operation is first reported or Xerox the original sheet.

1.13 In some cases the author does not clearly divide the paper into separately labelled experiments. This is true even though he may report several independent experiments under the same title. In such cases the analyst should distinguish as many separate experiments as were conducted, and then handle them as was described in 1.12.

Example: A recent paper by Winocur & Mills (1969) employed what the authors called three different behavioral tests. They labelled these tests alley preference, passive avoidance, and extinction. The same animals were used in all the tests but the operations employed in these tests differed greatly. This paper should be analyzed in three parts, the first of which is referenced as follows:

Winocur, G. & Mills, J.A. Hippocampus and septum in response inhibition. Journal of Comparative and Physiological Psychology, 1969, 67, 352-357.

Experiment one of three

2.0 Traditional headings are the titles, labels, or subject headings under which the paper is likely to be found using the usual indexing or reference terms.

2.1 The titles of most experimental papers incorporate one or more of the traditional headings listed in section 2.3 of this manuscript.

Example: Sgro, J.A. Complete removal and delay of sucrose reward in the double alleyway. _Journal of Comparative and Physiological Psychology_, 1969, _69_, 442-448.

Traditional headings are j2 and j4: change-extinction and delay

2.2 Include up to four traditional headings for each paper.

2.3 The following list of traditional headings, although far from complete, will be found useful.

TRADITIONAL TOPIC HEADINGS

A. CONDITIONING		B. DIFFERENTIATION		C. DISCRIMINATION		D. DRIVE	
a0	general	b0	general	c0	general	d0	general
a1	avoidance	b1	discrimination	c1	classical	d1	activity
a2	classical	b2		c2	compound	d2	exploratory
a3	escape	b3		c3	drive	d3	hunger
a4	higher-order	b4		c4	instr., single-prst	d4	irrelevant
a5	instrumental	b5		c5	operant	d5	learned
a6	operant	b6		c6	reversal	d6	pain
a7	sensory	b7		c7	simultaneous	d7	thirst
a8		b8		c8	transfer	d8	sex
a9		b9		c9	other	d9	other

E. GENERALIZATION		F. INHIBITION		G. INTERVAL		H. STIMULUS	
e0	general	f0	general	g0	inter-stimulus	h0	latent
e1	stimulus	f1	conditioned	g1	inter-trial	h1	spatial
e2	learned	f2	disinhibition	g2	inter-session	h2	probability
e3	response	f3	external	g3	retention	h3	VTE
e4	transfer	f4	temporary	g4	inter-response	h4	incidental
e5		f5	retro. and pro.	g5	intra-session	h5	observational
e6		f6	response supp.	g6	stimulus-response	h6	number of trials
e7		f7		g7		h7	
e8		f8		g8		h8	
e9		f9		g9		h9	

I. PUNISHMENT

i0	general
i1	intensity
i2	change extinction
i3	change-other
i4	delay
i5	learned-secon.
i6	pattern
i7	quality
i8	correlated
i9	varied

J. REINFORCEMENT

j0	general
j1	amount
j2	change-extinction
j3	change-other
j4	delay
j5	learned-secon.
j6	pattern
j7	quality
j8	correlated
j9	varied

K. RESPONSE

k0	general
k1	anticipatory
k2	chained
k3	consummatory
k4	conditioned
k5	delayed
k6	observing
k7	oscillation-variability
k8	unconditioned
k9	other

M.

m0	conflict
m1	frustration-aggression
m2	failure
m3	
m4	
m5	
m6	
m7	
m8	
m9	

N.

n0	brain, lesions
n1	brain, stimulation
n2	electro-convulsive shock
n3	drugs
n4	diet
n5	
n6	
n7	
n8	
n9	

O.

o0	instructions
o1	knowledge of results
o2	reasoning-problem solving
03	imitation-cooperation
o4	matching to sample
o5	reaction to time
o6	ready signal
o7	
o8	
o9	

P.

p0	contrast
p1	difficult
p2	effort
p3	rearing-handling-stimulation
p4	spontaneous recovery
p5	stimulus predifferentiation
p6	
p7	
p8	
p9	

Q. DEVELOPMENTAL EARLY EXPERIENCE

q0	imprinting
q1	early isolation
q2	rearing conditions
q3	exposure to specific stim.
q4	prenatal
q5	infancy
q6	childhood
q7	sensory & motor develop.
q8	language development
q9	intellectual development

R. PREFERENCES

r0	any response
r1	any stimulus
r2	
r3	
r4	
r5	
r6	
r7	
r8	
r9	

S. SENSATION

s0	psychophysics
s1	threshold/signal
s2	adaptation
s3	excitatory mechanism detection
s4	psychophysiology
s5	cutaneous
s6	olfactory
s7	taste
s8	proprioceptive-kinesthetic, vestibular
s9	

T. PERCEPTION

t0	objective
t1	form perception
t2	color constance
t3	brightness constancy
t4	size constancy
t5	distance perception
t6	auditory
t7	span of apprehension
t8	perception of motion
t9	

U. CONCEPT FORMATION

u0	solution shifts
u1	transfer
u2	concept identification
u3	problem solving
u4	
u5	
u6	
u7	
u8	
u9	

V. VERBAL LEARNING

v0	serial
v1	paried-associated
v2	mediating response
v3	transfer
v4	distribution
v5	whole vs. part learning
v6	semantic differential
v7	semantic satiation
v8	language learning
v9	

W. PERCEPTUAL LEARNING

w0	form
w1	other
w2	
w3	
w4	
w5	
w6	
w7	
w8	
w9	

X. TESTING

x0	intelligence
x1	personality
x2	aptitude
x3	
x4	
x5	
x6	
x7	
x8	
x9	

Y. PERSONALITY DISORDERS

y0	non-psychotic disturbance
y1	schizophrenia
y2	affective disorder
y3	chronic brain syndromes
y4	drugs
y5	psychotherapy
y6	group therapy
y7	addiction
y8	
y9	

Z. GROUP PROCESSES

z0	social structure
z1	social groups
z2	leadership
z3	attitudes & opinions
z4	cultural influence
z5	
z6	
z7	
z8	
z9	

3.0 Selection Operations

The procedures followed by the experimenter in limiting, describing, or determining the population of subjects which are used in the experiment.

3.1 Age. Only statements made about the age of the subjects at the beginning of the experiment which are expressed in terms of temporal units should be directly referenced in this category (e.g. 14 years old, 8 days old).

3.11 If the age as expressed in temporal units is an average taken over all the subjects than write average in this category and include the range or standard deviation of this averaged group of subjects if it is given (e.g. Average 62 days, range 32-108 days). If an average age of the subject is given but no estimate of variability is included with the average than write as follows: Average 62 days, variability NR.

3.12 Selection classes imply age. In many cases the age of the subjects is not explicitly expressed in terms of temporal units but is instead implied by some other type of information (e.g. college sophomores, army draftees). In the case of the college sophomores the information is directly placed in category 3.4 and cross-referenced to the age category (3.1). Thus, the analysis sheet at this point would be filled out as follows: 3.0 Selection Operations: 3.1 Age 3.4: 3.2 ______: 3.3 Groups ______: 3.4 Species-Genetic-Categories College Sophomores: 3.5 Sex ______.

3.13 Physical classification imply age. In the case of the rats which weigh 200 grams, the weight information would be directly entered under Body Measures (6.1) and the category number 6.1 would be placed under the age category (3.1). In almost all cases all non-temporal information about the age of the subjects will be directly placed in either category 3.4 or 6.1.

3.2 N N is the total number of subjects for which data is reported.

3.21 The total number of subjects entering the experiment is not always identical to the number for which data is reported. This is true if subjects are removed from the experiment for any reason (e.g. death) after the experiment has commenced.

3.22 All of this information should be reported by sub~~s~~tracting the number of subjects dropped, from the number that started the experiment and by writing the reason for this withdrawal after the sub~~s~~traction. The correct entry in 3.2 is given for the following example: If 50 rats are selected for study, but 12 die before the experiment is completed, this information is recorded (50-12=38 reason death). If no reason for withdrawal is reported than the entry should read (50-12=38 reason NR). If no subjects are withdrawn from the experiment than 3.2 would simply be (N = 50).

3.3 Groups: Record number of subjects in each group, using roman numeral labels for each group (e.g. I 10, II 8, III 7, IV 5).

3.31 If the group N's are equal, the following form may be used: "4 groups of 20".

3.32 If additional subjects are added to the experiment, after the original process-probe operations have taken place, and the same process-probe operations are replicated on these subjects, then these groups of subjects are called squads (e.g. Squad 11.6 would be the added group of subjects for which the same process-probe operation as was employed for Group II is used. "6" signifies the number of subjects in this squad). Also record in this category the time between the original process-probe operations and the squad groups.

3.4 Species-Genetic-Category

3.41 Report the species of the subjects as given either by Binomial Nomenclature or any verbal classification. Report all these if they are given.

3.42 Information on the genetic characteristics or breeding history of the subjects (e.g. F352 mice, inter-bred colony, maze bright) should be specified in this category.

3.43 Include loose generic labels applicable to group membership or clincial diagnosis of disturbances. Example: sophomores, army inductees, children from broken homes, children from homes in which physical punishment was used, etc. In some cases, such a label will be more appropriate with more specific information being described elsewhere. For example, for the label "cancer patient", anatomical data may be reported in detail under physical state (6.0). In such cases write "cancer patient 6.0 in category 3.4. Another example would be "children from homes in which physical punishment was used". If measurements concerning the occurrence or outcome of this physical punishment were systematically made, then the details of these measurements should be reported in experimental history 4.5 or process antecedent 4.4. In this case write "children from homes in which physical punishment was used 4.5" in category 3.4.

3.5 Record the sex of the subject as it is broken down into groups (e.g. Group one through four, 3 male-3 female).

3.51 If both sexes are used in an experiment, but it is not specified as to how the sexes are divided among the groups, then enter "both" in this category.

3.52 If subject's sexual characteristics had been altered (e.g. castrated, organ implant, etc.) the exact details of the intervention should be given in 6.0 (physical state) and/or 6.2 (surgical) and the cross referenced.

3.6 (Recruitment). Specify the method of obtaining subjects (e.g. amount paid, required gy rule, volunteers, referred by Psychiatrist, etc).

3.61 For animals, record facts of acquisition as they are given (e.g. born in own lab, acquired one day before running, shipped by air from California to Tennessee, collected in Borneo in 1966, acquired from Blue Spruce Company.

3.62 Unless exact circumstances of "recruitment" is reported, "required" is recorded for the report that subjects were "volunteers" from an introductory psychology class. Most of these types of courses require students to participate in experiments.

3.63 "Unknowing" may be used to refer to human subjects who are not informed that they are subjects. Animals studied in the field may be specified as such by the word "field". For example, a patient who doesn't know data is being collected on his behavior in the therapeutic situation would be "unknowing".

3.7 Behavioral Test. Record any measurement of an activity of the subjects taken in a standarized situation (e.g. 10 scores, TMAS, number of left turns in a T maze, GSR, etc.) which were used as a method of selecting S's for the experiment or for assigning S's to groups. This includes questions asked after the process operations which are used for the purpose of grouping data or making a statement about a given group (e.g., "Can you tell me about what you did that I said "good" after?")

3.71 In some cases a given operation is used not only to assign subjects groups but also for other purposes. For example, if operant level measurements are used both as an experimental baseline and as a behavioral test. In this case record the operations used to measure the operant level in 13.0 and cross reference to (3.7)behavioral test. Another common example would be those cases where a operation is used both as a process antecedent (see 4.4) and a behavioral test. Once again, record the operation in 4.4 and cross reference to 3.7 behavioral test. For example, suppose in an experiment on "hypnotic suggestion" that the investigators hypnotized the subjects previous to the experiment and selected for the experiment only those subjects that were susceptible to the hypnotic procedure. Since the hypnotic procedure was employed again in the process operation it is a process antecedent, and since it was used as a means by which to select subjects for the experiment it was a selection operation. Record the operation in 4.4 and cross reference to 3.7.

3.72 If assignment of subjects to groups was reported to be done on a random basis, then record "random" in this category, whether a behavioral test was employed or not.

3.73 If a behavioral test was used to select subjects for the experiment or particular groups, but a random assignment was still made within groups, then specify the exact nature of the selection operation and group assignment.

4.0 Antecedent Operations. The operations before and during (if run in a different environment and then returned to previous environment) the process operation. Antecedent operations may be iterative, occurring between blocks or sessions, but events occurring between trials are part of the process (see Chapter 1 for the definition of sessions, blocks and trials).

(4.1) Biocycles; Temporal Cycles. Chemical, anatomical, or behavioral changes that are recurrently time dependent.

4.12 Mating, courtship, estrous, wake-sleep, eating, etc.

4.13 These cycles are recorded when some other operation is performed with respect to the cycle. For example, if nest building in female rats in relation to estrous cycle is of interest than the phase of the cycle that these rats are in should be listed in 4.1.

4.14 Usually this category is not applicable to human studies and the entry N Re (Not Relevant) should be made here. There are exceptions. If one does a study on retention of verbal material in relation to time of day, than any available information of sleep-wake cycles should be entered here. Another exmaple would be a study on the eating behavior of women in relation to estrous cycle. The stage of the cycle would be entered in 4.1.

4.2 Maintenance-Feeding. Includes the what, when and how of feeding before the process operation (4.21). If deprivation schedules are used and food is used in the process operation (e.g. as an reinforcer) record the schedules in process antecedents (4.4) and cross reference from (4.2).

(4.22) If components of the diet (e.g. salt) are manipulated, record in Biochemical (6.3) and cross-reference from 4.2.

(4.23) Feeding during the process operation (i.e. between sessions, trials or blocks if food is continually available during the process) is recorded in maintenance-feeding-within (5.6).

4.24 Usually this category is not relevant to studies which use humans. A study of the effects of diets on the behavior of institutionalized children would be one obvious exception. The nature of the diets should be described here.

4.25 In some experiments candy is given to children after each experimental session. This information should be recorded in (5.6).

4.26 If there is a change in feeding procedure after the process operation has begun then record the change in 5.6. If there is no change then enter (4.2) in section 5.6.

(4.3) Maintenance-Ambience. Description of those parts of the environment before the process operation (particularly their changes) that are not manipulated interbehavioral events in the process operation and excluding manipulations of events involving contiguities and/or dependencies (cf. Experimental History (4.5) and Process Antecedents (4.4).

(4.31) This category refers primarily to the organism's normal living facilities. Common entries are group or individually caged, natural environment, temperature, artifical light-dark cycles,etc.

4.32 Ambience after the beginning of the process operation is recorded in (5.7) if there is a change in ambience from 4.3. If there is no change then place the entry (4.3) in section (5.7). The ambience during the process operation itself is recorded in (5.5).

(4.4) Process Antecedents. Manipulations (presentation/deprivation) of stimulus objects or events that are manipulated in the process operation.

4.41 Food and/or water deprivation should be listed in this category if food is employed as a reinforcer during the process operation. Care should be taken to specify in detail these deprivation operations as the method of food deprivation can prove to be very important.

4.42 In some cases the animals are reported to have been reduced to a specific body weight, e.g. (80% body weight). This information should be entered into category 6.1 and cross-referenced to category 4.4 if food is a relevant variable in the process operation.

4.43 If is often reported that the animal was "accomodated" or "habituated" to the apparatus. The procedures employed for this "accomodation" or "habituation" should be entered in this category.

4.44 If an operation is performed which differs only in some parameters from another operation which is called the process operation than both operations should be called process operations and be recorded in section 13.2. A common example is the case where 10 "practice trials" are given to a subject before each daily session. These practice trials are part of the process operation and should be recorded in 13.2. Another common example is found in the avoidance literature in which shock intensity is adjusted until a shock level for each subject is attained which best maintains behavior. All of the shock adjustments that were made including the final level attained should be listed in this category.

(4.5) Experimental History. Previous operations involving environmental events not used in the process operation.

4.51 If a child has a history of punishment by withdrawal of attention, and an experiment was designed which attempted to modify his behavior by presentation of a candy reinforcer, than the attention withdrawal history would be reported in 4.5. In this case different environmental events are manipulated in two experiments.

4.52 In the above case suppose the child was first punished by the withdrawl of attention and now positively reinforced by the presentation of attention for a specific behavior. In this case the withdrawal of attention experience would be listed in 4.4 (process antecedents) when analyzing the 2nd experiment. This would be done because the same environmental events are manipulated in both experiments.

4.53 Include in this category records of behavioral events that are not measured in the process operation such as fighting with cage mates, excessive aggressiveness, etc.

4.54 In some cases it is reported that a childs' experimental history is that he comes from a home in which some particular form of punishment or reinforcement was employed. This type of information should be included in this category along with a description of how this information was attained. For example, if an observer was in the home and recorded the events than this should be reported. Similarly, if the information is attained solely on the basis of estimates provided by the parents, than this method of documentation should be entered in category 4.55.

4.55 Naive is entered in this category only if the experimenter states that subjects have no experimental history. Not reported (NR) should be reported if no information is supplied at all.

(4.6) Response production. Technique employed to produce specific responses. These techniques are instruction, shaping, waiting, forcing, and demonstration.

4.61 Instructions -
Two classes of instructions are distinguished:

(4.6) instructions that give information about events in the process or probe operation, and (4.7) general, or non-process operations (stay seated, leave when you are through, put name at top of paper, etc).

4.62 Process instructions are categorized in two ways: the events about which information is given, and whether the information is full, partial and/or ambiguous, or false. The instructions are notated using the process operation notation, and the following additional symbols:

+	full
0	partial and/or ambiguous
-	false

Those events about which information is given in the instructions are recorded as in the following example:

If the instructions were:
"Lights will appear on the screen in front of you. Press one of the three buttons in front of you. If you press the button during the correct light, you will get a point on the counter each time. It shouldn't take you long to be pressing the key at only the correct time." Assume that a set of three lights ($S^{\cancel{S}}$), the button-presses ($R^{\cancel{R}}$), and the increment of points (S_R) have been recorded under Conditions of the Experiment. These instructions are notated. Note: (the symbols employed will be discussed under (12.0) conditions of the experiment):

$$\left(\overset{o}{S^{\cancel{S}}}\quad \overset{o+}{R^{\cancel{R}}}\quad \overset{+}{}\quad \overset{+}{S_R} \right)\quad \overset{+}{\not\Uparrow}\qquad \overset{+}{\left\{R^{\cancel{R}}\right\}_{n/n}}$$

No information was given about the number of trials or duration of sessions. Partial information was given about the nature of the stimuli. No information was given about the relationship between the stimuli. Full information was given about the response, but only partial information was given about the relationship of the response to the stimuli. Full information was given about the implicative, the S_R and the expected outcome. Partial information was given about the number of trials.

4.621 To whom the instructions were given (parents, subjects, peers, etc.) should be stated along with the description of the instructions. In many cases different instructions are given to different groups involved with the experiment. The different instructions should be labelled according to when they were given.

4.63 Shaping. Shaping has been applied as a label to many operations that bring low frequency R's to higher frequencies (e.g., so called "autoshaping"). The use of this term is here restricted to the procedure of "successive approximation". Using process operation notation, record the procedures of shaping, and its parameters.

For example: (R = successive approximateions to R)

one hour (01 - R = Sr - r min)

In recording shaping operations, include parameters and successive criteria, as below.

ITI = v. $\overline{2}$m, = .52m (i.e. varied time between trials - (Trials are defined in this case as presentations of 01) - with an average ITI of two minutes and a standard deviation of .52 minutes).

Successive Criteria=body toward key, head facing key, head near key.

4.64 Waiting. This technique involves observing the subjects behavior until the desired response occurs. Most often positive or negative reinforcement presentation followed the response upon its recurrence.

4.65 Forcing. Physically "putting the subject through" the stages which lead to the response which is to be produced. For example, taking the hand or paw of the subject and physically pressing it against a bar in order to produce a bar-press response.

4.66 Demonstration (modeling)- This technique presents to one organism another organism who is performing the response that one wishes to produce in the first organism.

4.67 Some experiments are designed solely to investigate the different methods of response production. In this case these methods should be notated in section 13 and not in the response production section. For example, some experiments on desensitization are designed to investigate the operation of shaping. These shaping operations should be reported in section 13.

(4.7) Non-Process Instructions. Instructions not directly related to events in the process operation. E.g., "try hard", "sit up straight", "most people finish in 10 minutes", "place your left hand on your lap, your right on the button, and stay alert".

(5.0) Conditions within. Operations carried out during the experiment proper.

(5.1) Biocycles: Temporal Cycles. Same as (4.1) but for the period of the Process Operation.

(5.2) Time. Time of the year, month, and day when Ss were run.

(5.3) Apparatus. Description of the manipulanda, environments for locomotion, stimulus objects, instruments for measuring and programming (see also 12.3), materials for intervention (e.g. stereotaxic instrument), description of the physical construction and dimensions of apparatus as a whole. Also, specify whether the apparatus was standard, modified, or unique.

(5.4) Location-Situation. Nature of the location of the apparatus, e.g., laboratory, natural habitat, dorm room, etc. Include whether or not a restraining apparatus was used.

(5.5) Ambience-Microclimate. Environmental conditions within the apparatus, e.g., temperature, humidity, sound attenuation, color, other organisms present, etc.

(5.6) Maintenance-Feeding. Specify any changes in (4.2) which occur after the beginning of the process operation.

(5.7) Maintenance-Ambient. Specify any changes in (4.3) which occur after the beginning of the process operation. (Extend the line above (5.6) on the analysis sheet across the page).

6.0 Physical State. This category is designed to record all relevant details about the physiological, physical and biochemical state of the organism. Most often experiments that directly intervene with the physical state of the organism contain information which should be included in this section. In such cases, both the normal and post-intervention state of the organism should be reported in this category in addition to the exact details of the experimental intervention that was designed to produce a change in the physical state of the organism.

Information germane to this category would include information about any surgical or pharmacological manipulation, nutritional states, diseases, congenital abnormalities, physical appearances, and of biochemical states. More specific examples of information relevant to this category are given in the sub-categories. The physical description of the state of the organism in addition to the information recorded in the selection operations section, defines the population of subjects for which the data of the experiment was collected.

6.1 Body Measures. This category records information pertaining to specific body organs or general physiological features. Include information about body weight, skin color, fur texture and eye color in this section.

6.11 For example, a study on pain threshold chose as subjects only females with blue eyes. In (3.4) "blue-eyed females" should be written and in category (6.1) the entry (3.4) should be made.

6.12 In some cases the experimenter reports that the deprivation conditions of the experiment were designed to reduce the organism to 80 or 90 percent body weight. This result should be entered in section 4.4 and cross-referenced to 6.1.

6.13 In a study using rats in a water maze, body weight might be reported as follows: Body Weight: 150-300 gm, $\overline{x}$ = 265.

6.2 Surgical. Specify all relevant details of surgery; location of lesions, stereotaxic coordinates, method of producing lesions, time of surgery with regard to process operations, etc. Also, include specifications of "accidental" surgical or physical interventions.

6.21 In addition to the details specified in 6.21, also supply all relevant information that is given about electrode or cannula implantation; the physical characteristics of the electrode or cannula; whether is is a chronic or acute preparation, how the cannula or electrode is held in place, etc.

6.22 An example of the type of surgical details that should be reported would be: the subjects were anesthetized with sodium penobarbitol and positioned in a ear bar stereotaxic instrument. The skull was exposed and bilateral holes were drilled with a No. 9 dental burr 1.5 mm Anterior to the Bregma and 1.0 mm lateral to the sinus. A stereotaxically guided electrode was lowered to a depth of 5.0 mm and electrolytic current of .28 mm was conducted through it for a period of 25". The holes were covered with gel-foam and the surgical wound was closed with "gut" stitching. Surgery took place 2 weeks prior to behavior testing.

6.23 It would be relevant to report that a clinical subject had burn-scar tissue on 60% of his face. This would be an accidental physical intervention.

6.3 **Biochemical (Hormonal-Pharmacological)** Notate any biochemical intervention, specifying dosage, time of administration, route of administration, etc. This category also includes any measurements that are made of natural or induced biochemical state; e.g., blood sugar, hormone levels, etc.

6.31 In some cases the subjects of the experiment are selected on the basis of some biochemical characteristic. For example, a study on homosexuality may select for investigation only males with high estrogen blood levels. All facts relevant to the measurement of these blood levels should be entered in 6.3 and cross-referenced to selection operations (3.4).

6.32 In a study of clinical behavior modification, it would be relevant to report: S on daily oral dosage of thorazine, .x mg dose, given before dinner.

6.33 Another common example of an entry in this column would be: .20 cc of Procaine Penicillin, injected with a No. 20 needle interperitoneally after surgery was completed. Details such as this are usually reported in the surgery section of experiments. The fact that drug injections which are made during the surgical procedure are in fact biochemical intervention, is a fact which is often ignored or uncontrolled for in experimental designs.

6.4 **Nutritional**. Any abnormality of the organism's nutritional state such as salt deprivation, avitaminosis, protein deficiency, etc.; whether induced or selected for.

6.41 For example, investigation on the health of babies in ghetto mothers might include the entry that the mothers of these babies suffered from "severe protein deficiency as inferred from diet analysis".

6.42 Another example would be the experiments on weight reduction that select for subjects only those people with specified blood sugar levels. The fact that this selection operation was used should be reported in (3.4) but the details of the measurement procedures and the results of the measurements should be made in this category.

6.5 **Histological analysis**. Specify all relevant details of histology including methods of tissue preparation, staining techniques, thickness of tissue cuts, etc.

6.51 A common example would be: the animals were profused with saline and 10% formalin, the brain removed and placed in 50% alcohol for a 24 hour period. Frozen tissue 50μ sections were taken with every 10th section mounted on slides and stained with cresyl violet.

7.0 Design-Data Analysis. This section should include all relevant details about how data were collected from the experimental subjects. Such information as how experimental subjects were grouped, who collected data, what transformation techniques were used with the "raw" data and what types of statistics are used as the basis for inference or inter-group comparisons is relevant to this section.

How well experimental variables were controlled or isolated, how objective the data collection techniques were, and how data curves were generated are a few of the questions that information placed in this section is designed to encompass.

7.1 Subjects run by. Identity and characteristics of those experimenters that are responsible for collection and/or analysis of data.

7.12 Included in this category are investigators who "rate" behavioral events of the subjects irregardless of whether or not the "rater" actually came into personal contact with the subjects.

7.13 "confederates", "stooges", or "dummys" which are planted in the experiment by another investigator should be described in this category.

7.14 Common entry is: data were collected by the principle investigator on television tapes and rated for levels of aggression by the second and third authors of this paper. The methods used in rating "aggression" are outlined in 12.3.

7.15 Sometimes in the behavior modification literature it is reported that a subjects' peers were instructed to behave in a specific fashion toward the subject. This fact and any information about these peers should be reported in this section. A common entry might be as follows: "Subjects' fourth grade classmates were instructed to ignore all crying behavior of the subject." See instructions (4.6).

7.2 Any data analysis procedure which omits data collected from any subject or which utilizes after-the-fact data grouping should be reported.

7.21 Examples of common data analysis procedures which sould be reported are the following: (1) those cases where an experimenter compares inter-response-time (IRT) distributions of "criterial" Vs. "non-criterial" subjects; (2) When the data of more than one group of subjects are combined after the probe operations have been carried out; (3) When data is discarded from analysis because of any reason (e.g. observer reliability on datum did not reach criterion levels or "six of the experimental subjects died before the experiment was completed").

7.22 In some cases the experimenter states that he started the experiment with four different measurements but that he is only going to report on one of them. This fact should be recorded even if he makes a report on the other measurements in a different paper.

7.3 Statistical-Techniques - Experimental Design. Listing of mathematical-statistical techniques used. Statement of statistical and methodological control practices.

7.31 Examples of design procedures that are commonly used are matching, counter-balancing, factoral design, etc. Details of these designs such as what variable(s) the groups were matched on, should also be included in this category.

7.32 For example: "Ss were matched on age, than randomly assigned to one of the four groups. 2 x 2 ANOVA for matched-groups statistical analysis".

7.33 Common cases of data transformation procedures which should be reported in this section are percentage and "log" transformations. For example, an experiment measured a total of four behaviors and transformed each individual behavior into a percentage of total behavior. The details of this transformation should be reported.

7.4 Pilot Experimentation. Report of previous experimental work by E that led E to selection of these particular experimental procedures and conditions.

7.41 In some cases naturalistic observations may suggest the experimental operations that are of relevance to the experiment being reported. In these cases, the details of the observation should be reported in this category.

7.42 For example, an investigator observed that when two rats were placed together in a Sidman avoidance situation fighting instead of bar-pressing occurred. He made this observation the basis for another study on "aggression". This fact should be reported in the operational analysis of the "aggression paper" as; "naturalistic observation of fighting behavior" in Sidman avoidance paper (1969). Prior paper (Reference of prior paper).

7.43 Another appropriate entry in this column would be the following report: "Previous work indicated that the process operation produced no changes in behavior in either Sprague-Dawley or Wistar rats".

8.0 Terminological Outcome. Many experiments report that an environmental event or experimental operation come to exert a different control of behavior than the operation or event controlled or was expected to control before the experiment was begun. Some experiments are designed solely to produce stimulus (behavior controlling) properties in an event that did not possess these qualities at the beginning of the experiment. If an environmental or organismic event or an operation changes its control of behavior as the experiment is conducted, than these changes should be reported in this terminological outcome section. These changes are to be notated with the following notation:

$\equiv$	is equivalent to
$=$	is (an instance of a given class)
$\rightarrow$	becomes, - i.e., the category is changed by the operation

8.01 In a study on secondary reinforcement suppose a light is paired with food until the light becomes a secondary reinforcer. This fact would be entered in this category as $S \rightarrow S^r$.

8.02 In a shock punishment study the shock stimulus is generally notated as S^a before the experiment is conducted. This is done because of the extensive experimental literature which demonstrates that shock is an aversive stimulus. Suppose that the outcome of a study reveals that shock increases rates of responding rather than suppresses it. This outcome should be noted in category as $S^A = S_R$.

8.03 Some experiments are designed solely to prove that a given environmental event is a stimulus (i.e. have behavioral controlling qualities). For example, suppose an experimenter wanted to demonstrate that a dog would discriminately make an avoidance response when X-radiation was presented to the animal. In the absence of an experimental literature to prove otherwise, X-radiation would be notated as a putative stimulus (ϟ). If the outcome of the experiment demonstrates that a dog will avoid X-radiation, than this would be noted in this category as ϟ $= S^A$.

8.04 In some cases, an experiment demonstrates the equivalence of two operations. For example, a study on response suppression might demonstrate that positive reinforcement withdrawal and presentation of an aversive stimulus produce the same outcomes. This outcome should be noted in this category as $\overline{S}_R \equiv S_A$.

9.0 Most experiments define dependent variables upon which they make measurements in hopes of finding a relationship between these measurements and the independent variables. In some cases observations and measurements are made of events which were not defined as dependent variables prior to the experiment. These observations are sometimes made the basis for further experimentation. Reported observations of any measures (physical, behavioral) which are not explicitly defined as dependent variables should be recorded in this category.

9.1 For example, an experiment on avoidance conditioning employed two groups of subjects. One group received a signal 5 seconds before a shock was programmed to occur while the other group did not receive the signal. The dependent variable in this experiment was defined as a 10 gram bar-press. Every bar press delayed the occurrence of the next shock by 5 seconds. In addition to the bar-press measurements, the investigators recorded body weight and found that the unsignalled shock group lost weight in respect to the signalled shock group. This differential weight loss should be reported in this category.

9.2 A good example of an entry that should be made in this category would be Brady's initial observation that animals which controlled shock contingencies suffered more "ulceration" than animals which were merely shocked. He made this "other outcome" result the basis for his now famous study which was designed with ulceration as the dependent variable.

10.0 E's Purpose and Summary. Brief resume of what E thought he was doing and how he thought his data was relevant to what he was doing. The experimenter usually reports his purpose and summary in an abstract at the beginning of an experiment. The investigator attempts to "interpret" data in a manner consistent with his stated purpose in a popular "game" that is often reinforced by theoretical oriented journal referees. Such attempts to reconcile the purpose and summary at the expense of objective data description provides the analyst with something to say in section 11.0.

11.0 Comments. Free comments by analyst. Most frequently this is used to note confounded variables not reported by E, or for satirical comments about (10.0).

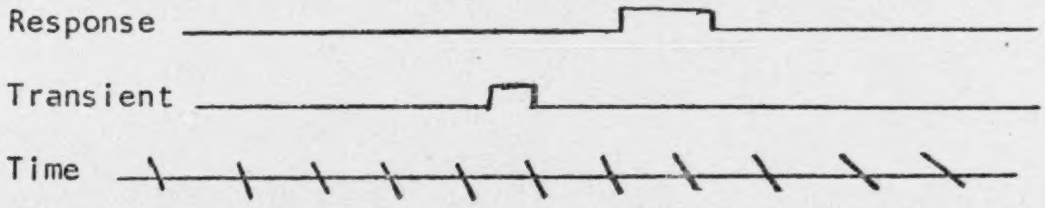
11.1 This is a "catch-all" category where any information the analyst thinks is important or relevant should be entered. There are no common examples which can easily be used as guidelines for this section. The analyst is encouraged to write anything that need be said about the experiment that he feels has not been said or adequately emphasized in any other category.

12.0 Conditions of the Experiment

12.1 The environment of the organism could also be called the "field" of the organism. The "field" includes all aspects of the internal and external environment of the organism, and the organism itself.

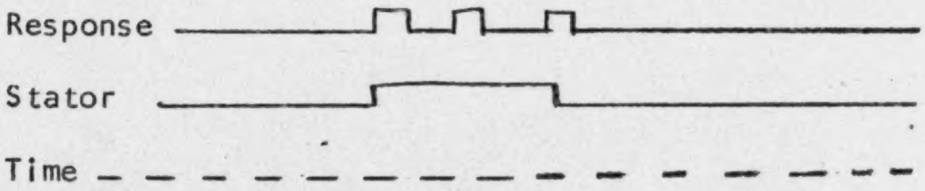
The prime purpose of most experimental work should be the description of relationships between these different aspects of the field. In order to annotate experimental behavior, the "field" situation is artifically divided into three classes of events: transients (S), stators (O) and environments (E). Transients and stators are subcategories of the larger class, stimuli.

12.11 Transients(S) - are behavior-controlling environmental events when latency plus the duration of the measured response is equal to or greater than the duration of the environmental transient event, hence, only one response is possible. This could be diagrammed as follows:



Many stimuli by their nature are discrete transient events such as a loud explosion to which a heart rate response is measured. If the response measure is amount of time it takes the heart rate to return to the level it was responding before the explosion and the explosion lasted .01 seconds, than the explosion is a transient labelled S1.

12.12 Stators (O)- are behavior controlling environmental events that continue long enough so that more than one R or L (Locomotion) is possible during their duration, or whose duration affects the behavior. This is diagrammed as follows:



The measures of response that are made distinguish between the stimuli and stators. For example, in one experiment a one sec. light was flashed "on" and "eye blinks" which occurred during this flash were measured. It was found that an eye blink took an average of .4 seconds and that 2 eyeblinks could occur when the light was flashed. The light flash was, therefore, a stator. In a second experiment the same 1 second light flash was used as a stimulus but now the response measure was a 90 degree leg flexion. It was found that a 90 degree leg flexion took an average of 2 seconds and that no 90 degree leg flexion took less than 1.5 seconds. The 1 second light in this experiment was a transient S. It should be noted that the onsets and offsets of stators are themselves discrete events, and hence can be stimuli, but are not recorded additionally as such.

Like all distinctions between sets of events, there is a marginal area where a question may arise.

1) If the environmental event is terminated by the occurrence of one R or L, the event is a stator no matter what its duration. For example, suppose a light is programmed to come on for .5 seconds and then to automatically go off. If the organism makes a response in less than .5 seconds, the light will go off when the organism makes the response. The light is then termed a stator (0).

It should be noted that one cannot say an event has behavior controlling properties before the event is manipulated in some resepect. For example, one cannot know if a light controls pupil dilation until the light is both presented at one level and then changed to a different level. A defining characteristic of any stator or transient is that it be manipulated and that it shows a systematic relationship to behavior. If an event is not manipulated it cannot be said to have behavior controlling properties or to be either a transient or a stator. In some cases there is no experimentation or information which would suggest that an event has behavior controlling qualities, i.e., is a transient or a stator. In such cases the event is arbitarily annotated as either a putative transient or a putative stator. If this putative event is manipulated in the experiment and it is demonstrated that this event controls a behavior, the formerly putative event becomes a transient or stator. This change in classification should be noted in terminological outcome 8.0.

12.13 Environment (E)- In most experiments specific aspects of the organism's environmental field are described, manipulated and isolated for study. When specific circumscribed events are so treated they meet the necessary requirements to be termed stators, transients, putative stators or putative transients. In some cases large aspects of the environmental field are left unanalyzed and largely undefined. Such environmental events that remain unanalyzed are annotated as (E). For example, in a shuttle box experiment an animal was required to move from compartment A to compartment B when a guillotine door separating the two compartments was raised. If the animal did not move between compartments when the door was raised, he was shocked. If he did move between the two compartments the door was lowered and the animal was not shocked. The guillotine door is defined as a stator because it is one part of environment that is analyzed and manipulated (it is raised and lowered). The compartments were not analyzed nor were they manipulated. The were always present. They are annotated as E1 and E2.

In another case suppose that an experimenter takes a child from a classroom and places that child in a "time-out room" every time he fights with other children. The "time-out room" is abstracted out from the field of the organism and manipulated. It is manipulated because its presence or absence is contingent on the behavior of the organism. It is termed a 0. The classroom is also an 0 because its presence or absence is also contingent on the behavior of the organism (it is manipulated). Suppose that the experimenter wants to now measure the effect of his "time-out procedure". He, therefore, asks the parents of the child to record all times that the child fights at home. The "home situation" is annotated (E) because it is not analyzed nor manipulated.

The criteria which distinguish between environments (E) and stators (0) or transients (S) are not always clear. The best distinguishing factor is probably that Es are events which the experimenter does nothing to. They are only there and the experimenter does not act on then. The organism can act on an environment by moving from it to another compartment, or stator, but the experimenter cannot move the organism from one compartment to another or make an environment contingent on the behavior of the organism.

The "time-out room" in the above example was defined as a stator because the experimenter made its presence or absence contingent on a behavior of the organism. If the organism moved himself from the classroom into the "time-out room" with no outside influence from the experimenter, then the "time-out room" would be an (E) instead of an 0.

There are two kinds of transient (S) or stator (0) or (E) sets: For example, if a list of no nonsense syllables are all flashed on a board at the same time and the subject is to pick out the one that is colored red, this list of ten nonsense syllables would be noted as either $\not{S}$ or $\not{0}$. If the list of 10 nonsense syllables are flashed on a board one at a time, then the members of the set should be noted as either $S^{\not{S}}$ or $0^{\not{0}}$. Whether S or 0 is used will depend on the criteria already discussed for stator and transients.

Another common example when these "set" annotations would be helpful often occurs in behavior modification experiments. Suppose in experiment I that a piece of candy, a "pat" on the head, and a toy are all presented to the subject whenever he speaks. This set of response contingent events are annotated as $\not{S}$ or $\not{0}$. In experiment II the piece of candy is given for the first spoken word, a "pat" on the head for the second spoken word, and a toy for the third spoken word. This set of response contingent events is annotated as $S^{\not{S}}$ or $0^{\not{0}}$. Only one environment can be presented to the organism at a time. For example, suppose the experimenter placed the organism in box I on some days and measured "activity" levels and in box II on other days to measure activity levels. This would be the presentation of "environments" one at a time, annotated as $E^{\not{E}}$.

12.14 $\overline{\text{SI}}$, $\overline{\text{0I}}$, $\overline{\text{EI}}$. Any S, 0 or E other than the ones described and annotated on 12.1 is annotated as $\overline{S1}$, $\overline{O1}$, or $\overline{E}$. For example, an experimenter allowed a child to stay in a preferred playroom whenever he did not "wet" his bed at night. This playroom would be defined in 12.1 as O1. If the child did wet his bed he was not permitted to go to the playroom but he was permitted to go anywhere else in the house. The entire home, other than the playroom, could be annoted as $\overline{O1}$.

12.15 M; Manipulandum. The manipulandum is any part of the "field" of the organism that is necessary to define a response. A manipulandum can act as a stator or transient but even if it has been demonstrated that it is a O or S, it is notated as M (manipulandum).

The most common example of a manipulandum which is a stator would be a retractable bar. Suppose that the bar is presented to the organism and 16 gram presses of the bar recorded for 5 minutes. Next the bar is withheld for 5 minutes. The bar is a stator because it is manipulated (present or absent) and because it is related to bar press responding. It is a manipulandum because it is necessary for the definition of a response. It is notated as M1.

12.16 RS,RO - Verbal R that has been shown to be an S or O. The most common example of a RS or RO is the spoken word that serves as a O or S for either the organism that spoke the word or another organism that heard the word. For example, if a teacher says "Rise!" and the students all stand up, then the word Rise is a OR. If a child learning to find his way home always says "turn left at the next corner" before he turns left at the next corner than the verbal utterance "turn left at the next corner" is a OR.

12.17 S, O, R and L Descriptors

General Considerations

Superscripts

Alphabetic superscripts are used to denote S, O, R & L terms which are ranked along a qualitative continuum of similarity. Numeric superscripts are used to denote quantitative similarity, e.g.:

S^A, S^B, S^C, or $S2^A$, $S2^B$, $S2^C$

R^A, R^B, R^C, or R^1, R^2, R^3, etc.

To specify direction for locomotor responses, the following superscripts are used.

L^s	locomotion towards location of specified S or O or E
$L^{\bar{s}}$	locomotion away from location of specified S or O or E
L^o	locomotion with respect to a specified reference point or to the subject's initial longitudinal axis, reference point or initial axis is recorded with specification of L under (12.2) conditions of the experiment.

Midscripts

All S, O, R and L terms are distinguished by numeric midscripts, and then experimentally defined (S1, S2, R1, R2, L1, L2). Each term is numbered separately, and if only one term of a class occurs, the midscript is omitted. Numbering is determined by the order of occurrence in the process operation. Where presentation or occurrence is simultaneous, then the S or R that will be used in the probe or measurement operations are S1 or R1, respectively.

(12.2) Behavior. The units of behavior are response and locomotion. They are both defined as parts of behavior that are identifiable, enumerable, and related to some other variable, at least time. They are further distinguished on the basis of their measures.

Locomotions are behaviors related to the geography of the environment and is typically continuing behavior. Discrete instances of locomotion are not operationally distinguishable, on the basis of measurement from discrete responses. There are, however, behaviors that may be measured either as discrete responses, or as locomotions (e.g. eye movements). These are dealt with according to the measurement operation followed. In the event that the dictionary's definitions of "discrete" and "continuous" are not lucid in this application, a discrete locomotion is a singly occurring (i.e. not repeated or continued) part of behavior that moves the organism from point A to point B, e.g., a jump, a start, a hurdle-cross, and the like. Discrete locomotions are literally saltatory. All locomotive behavior, however, is not measured (and thus defined) as locomotion. Locomotion measures are in respect to geography (speed, angle, acceleration, etc.). If, for example, enumeration of turns in a T-maze is the measure used, it is classed as a response. By the same logic, some locomotions are not strictly locomotory. If geographical measures are made of eye movements, paw movements, etc., they are classed as locomotions. The measurement defines the class.

Responses are recorded in the process, probe and baseline operations only if some event is dependent on them. All measured (or identified) response terms and how they were measured are described in 12.2.

12.21 For example, suppose that an experimenter states that he is measuring left bar press and right bar presses. Suppose further that the left bar press is only recorded if the press exceeds 20 grams and the right bar press is recorded only if the press exceeds 30 grams. This would be recorded as:

$\{R_1\}_n$ = 20 grams or higher right bar press

$\{R_2\}_n$ = 30 grams or higher left bar press

12.22 If an experimenter is recording a childs behavior in the classroom suppose he measures the speed with which a child moves from the classroom to a drinking fountain. This is a discrete locomotion since the speed measure is in terms of geography and is defined in this section:

$\{L_1\}$ = Speed of moving from classroom to drinking fountain

12.23 In the above section suppose the experimenter simply "counts" the number of times that the child goes to the drinking fountain. Since this "count" measure is not in respect to "geography" it is not a locomotion but a response. This is defined in this section as:

$\{R_1\}_n$ = number of times the child goes to the drinking fountain as counted and marked on a rating sheet by E

12.24 In some cases the experimenter makes physical measurements such as body weight, fluctuation, ulcer occurrence, or hormonal levels. These measurements should be recorded in this section as responses but the exact details of the measurements should be notated in section 6.0 (Physical state). For example, if plasma levels of 17-hydroxycorticosteriod (17-OH-CS) is measured in Sidman avoidance experiments than this should be notated in this section as:

$\{R_1\}_A$ - levels of 17-OH-CS in plasma (see 6.3). The exact details of the measurement should be made in 6.3 (Biochemical measures)

A list of response terms and an example of each is given in Table 1 and on the next page.

12.25 $\overline{R}$,$\overline{L}$ - Negation annotation: A line drawn above a R or L signifies any R or L other than the R or L treated as such. For example, an experimenter presented a food pellet to a rat for a bar press R_1 = bar press. Any response other than the bar press was shocked ($\overline{R1}$) = any response other than a bar press.

12.26 Putative response (P); Putative locomotion (⅄). A response or a locomotion is defined by the fact that they are enumerable and related to some other "field" event. If a behavior is enumerated, but if its relationship with another "field" event has not been demonstrated, than the behavior is termed a putative R (P) or putative L (⅄). For example, an experimenter recorded brain wave activity as an organism was locomoting through a maze. The brain wave activity is annotated (P) until its relationship with another "field" event; i.e., a left turn in the maze, the color of the goal box, etc. is substantiated.

12.27 $\not{R}$, $\not{L}$. set of concurrent responses or concurrent locomotions. In some cases more than one response that can occur at the same time are measured. For example, if brain wave activity, heart rate and bar presses are all measured at the same time than this is annotated as $\not{R}$-brain wave activity, heart rate, bar presses. If it is not known whether or not all of the behaviors measured are related to some other field event (i.e., whether or not they are responses) than it is best to break the behaviors up and define them independently. In the above example, there is previous experimentation which indicates that brain wave activity, heart rate and bar presses are related to positive reinforcement. Therefore, these three simultaneous measures are annotated Rl if they are measured in an experiment employing positive reinforcement. Suppose that these three measurements are simultaneously made in an experiment employing negative reinforcement. Suppose further that it is known that bar presses and heart rate are related to occurrences of negative reinforcement but that it is now known how brain activity is related to occurrence of negative reinforcement. This should be notated as follows: P-brain wave activity: $\not K$-heart rate, bar-presses.

12.28 Definition of response in some cases is on the basis of correspondence with the current stimulus situation. In situations like the following, where the experimental task is to learn to press one of several buttons in correspondence with one of several stimuli, the following notation is used:

$R^{\not K}$: the "correct" response from a set in correspondence with the current stimulus situation

$\overline{R^{\not K}}$: any other response from the set but the "correct" response by correspondence

In the process operation, such cases would be noted:

$$\{ \; S^{\not S} \quad R^{\not K} \supset S_R \}$$

12.29 A notational system has been developed to facilitate the recording of the response measures made. This system is summarized on the following three pages.

RESPONSE-MEASUREMENT OPERATIONS

Measurement operations are those operations performed in order to assess or measure the stimulus, stator, response, or locomotor terms, following the given process operation(s). At present, the notational system for the stimulus measurements has not yet been fully developed. The following table presents the measurement notation for R and L terms.

Measurement of R, No antecedent S required

Measurement of Single R		Measurement of Repetitive R*		Measurement of L	
A	amplitude	n	number;subset	s	speed
Int	intensity	N	number;set	d	distance
V	precision	n/NR	relative frequency with respect to other R's	θ	direction

continued next page

Measurement of Single R		Measurement of Repetitive R*		Measurement of L	
t_R	duration	$\approx$	rated relative frequency	a	acceleration
		N_t	burst length		
		n/t	rate		
		$n_{1/t}$	incidence (one or more R per time unit)		
		t_R^{-1}	inter-response time, same R	T	duration
		t_P^{-1}	inter-response time, different R's		
		T_N	burst duration		
		T	total duration		
		f_T	some function of total duration (includes body wt.)		
t	latency (interval from S onset to R onset)	n/Rs	relative frequency	t	latency (interval S or E onset to L onset)
t_p	after discharge (interval S to R offset, or 0-R offset)	t_r	latency of a change in rate		

* These are distinguished from statistical operations that require multiple instances,- e.g., computation of averages and the like

The notation for measurement operation appears as a subscript outside the brackets that enclose the measurement operation. For example, if the amplitude (A) or R1 is being measured, it is denoted $[R1]_A$. Multiple measures of the same response are possible. For example, the number (n) and rate (n/t) of R2 would be noted $[R2]_{n,n/t}$.

For measurement of responses that occur with respect to an antecedent stimulus, the following notation is used:

$[R^{S2}]_A$	R controlled by S2 prior to start of experiment
$[^{S2}R]_{n/n}$	relative frequency of R in the presence of S2

This form should be used in recording and describing all response or locomotion measures in section 12.2.

12.3 Implicative Identity. This section is used to record the manual, physical, or other means of carrying out the implicative relationship (e.g., observer dispensing food manually to a rat every time he presses a bar, vs a programmed mechanical apparatus). There are four primary methods employed to carry out the implicative relationship.

12.31 Mechanically by hand. An experimenter manipulates a mechanical apparatus which in turn controls the stimulus of the implicative relationship. The experimenter directly observes the behavior in these cases and acts as a response "transducer".

12.311 Whenever a child smiles the experimenter pulls a lever that releases a piece of candy to the child.

12.32 Electromechanical. The manipulation of the stimulus in the implicative relationship is "automatically" controlled by electrical and mechanical design. The experimenter is not directly involved in the implicative relationship.

12.321 Whenever a rat pushes a bar a electrical pulse activates the feeder mechanism whereby a food pellet is dropped into a magazine.

12.33 Personally by hand. The experimenter directly hands the stimulus of the implicative relationship to the subject.

12.331 When the child screamed he was slapped in the face or whenever the child laughed he was "patted" on the head.

12.34 Personally-verbal. The experimenter directly manipulated the stimulus of the implicative relationship by his own direct verbal behavior. Verbal behavior in this case includes facial expressions, written content and "hand" symbols as well as the "spoken" word.

12.341 When the subject said "I", the experimenter said "good";
When the subject said "Agnew", the experimenter "frowned";
When the subject wrote the word "help", the experimenter wrote next to it "wrong";
When the subject said "Nixon", the experimenter held up his middle finger.

13.0 Syntatic (Process and Probe Operations)

A. Implicative

To state the relations between the stimuli and responses in the process operation(s), programmed by the experimenter, or established by natural order the following notation is used:

Implicatives

On Every Occasion	Probabilistic	Correlated
⊃ imply	⊃⃝ imply	$\supset\!\!\!\!+$ positively correlated S- or O-consequence with R-measure
$\bar{\supset}$ imply other than	$\bar{\supset}$⃝ imply other than	
∼ preclude,prevent	∼⃝ preclude, prevent	∋ S- or O- consequence negatively correlated with R-measure
⊣ force	⊣⃝ force	
, absence of implicative (non-dependent,* i.e., contingent sequence possible by chance)	,⃝ "randomized" by rule	

The above symbols specify the frequency and manner of occurrence of the designated operation - on every occasion (p = 1), probabilistically (0 p 1), or correlated either positively or negatively. Probabilistic may be further specified; this implicative does not imply truly random ordering, but a specifiable relationship that does not hold on every occasion.

We find it essential to maintain the distinction between "dependent" and "contingent" sequences, as first clearly distinguished by Reynolds, G.S. A Primer of Operant Conditioning. 1968, Atlanta: Scott,Foresman & Co. Dependent event "necessarily" (mechanically, or otherwise) follow the event on which they are dependent and otherwise do not occur. Contingent events follow other events accidentally. Thus, two random events may sometimes be contingent, but by definition neither is dependent on the other.

The following cases of implicatives are instructive:

$R \supset S$ - S is dependent on R. S always follows R, and only follows R

$R \supset S, S$ - S always follows R, but occurs randomly at other times as well

R S - S occurs randomly with respect to R. It is not dependent on R, but it may follow (be contingent on) R

$R \supset \overline{S}$ - Any event other than S is dependent on R. S does not occur at all, unless dependent on some other R (c.f. the relationship below)

$R \supset \overline{S}, S$ - Any event other than S is dependent on R. S never occurs following R, but occurs randomly at other times

$OR \supset \theta$ - After the onset of 0, R implies the offset of 0 (terminates 0)

B. Ordering Terms

To specify the ordering or presentation of the S,0, R, and L terms, the following notation is used:

Ordering Terms

X	Paired temporally,sequenced. The time interval may be specified below X when appropriate.	⊗	Probabilistically paired in sequence.
/	Paired simultaneously	⊘	Probabilistically paired simultaneously.
'	Not ordered, random (X or Y,or both, or neither)	(')	Probabilistically ordered ("randomized" by rule)
·	Concurrent (X or Y, or both) (used only to refer to concurrent dependencies)	⊙	Concurrent, probabilistically (not invariably)
V	or (X or Y) (used to refer to events or dependencies)	Ⓥ	Or, probabilistically (not invariably)
◻	Permit to occur (usually omitted by convention)		

As in the case of implicatives, it is possible to order terms in a probabilistic manner. If two stimuli are sequenced (i.e. S1 precedes S2 in the order or presentation), (S1 X S2) denotes this ordering. Similarly, if two stimuli are presented simultaneously, this ordering would be denoted (S1/S2). To indicate random presentation of two stimuli, (S1,S2) should be used. If either S1 or S2 is presented (but not both), S1 V S2) denotes this ordering.

To clarify the operations used as process operations, probe operations, and measurement operations, the following notation should be used:

Isolators	
( )	Encloses a process operation that is performed only once.
{ }	Encloses a process operation that is repeated or performed more than once with the same parameter values.
{̶ }̶	Encloses a process operation that is repeated or performed more than once with at least one change in the value of a parameter. Specify any change under the parameter values.
| |	Encloses the operation used as a probe only once.
ǂǂ	Encloses the operation used as a probe that is performed more than once.
{ }	Encloses event measured.
[ ]	Encloses terms that are isolated from normal sequential relationships and orderings.
( )	When used internally, encloses terms that are jointly ordered or related to other terms.

PROCESS OPERATION GRAMMAR

Pre-probe, process, and probe notation is written in left-to-right temporal and logical order. It is the same order, normally used in describing the operation in natural English. For example, "repeated presentations of the sequence of stimulus 1, followed after an interval by the simultaneous presentation of stimulus 2 and stimulus 3," is notated:

$$\{ S1 \quad X \quad S2/S3 \}$$

"The repeated dependency of a reinforcer presented simultaneously with stimulus 1," is notated:

$$\{ R \supset S_R/S1 \}$$

The normal left-to-right order of translation is modified by two isolators, the internal parenthesis, "()" and the bracket "[]".

In normal grammer each term is related to the adjacent term by the relationship or ordering term between them. Thus, in the example above, "R" and "S_R" are related by the dependency ordering term, "⊃", and "S_R" and "S1" are related by the simultaneity ordering term "/", and the sequence is simply the "addition" of the orders and relationships. If S_R is dependent on R, and S1 is presented simultaneously with S_R (note that it is only presented with S_R by this notation), then the event "S_R/S1" is dependent on R.

In other cases, the simple left-to-right addition of relationships will be insufficient for the writing of unambiguous notations. In these cases the internal parenthesis and the square bracket will be necessary.

Internal parenthesis enclose one or more terms that are jointly related to an adjacent term. The notation below is ungrammatical. S2 cannot be both related to S1 in the manner stated (invariably follows) and occur randomly with S3.

$$\{ \ S1 \ \ X \ S2, \ S3 \ \}$$

This notation can be rewritten in either of the following ways:

$$\{ \ (\ S1 \ \ X \ S2), \ S3 \ \}$$

The above notation reads, "S1 then S2, with the joint event of S1 and S2 occurring randomly with S3." The notation below reads, "S1, then S2 or S3 or both."

$$\{ \ S1 \ \ X \ (S2, \ S3 \ ) \ \}$$

Brackets enclose terms that are isolated from the normal sequence of relationships and orderings. Terms enclosed in brackets are "skipped over" in interpreting the referent of relationship and ordering terms, as below (arrows added to clarify the relationship between terms):

$$\begin{tikzcd}\{ \ 01 & {[} \ R \supset S_R & X & \theta\downarrow \ \} \arrow[lll, bend left] \end{tikzcd}$$

This notation is read, "during multiple presentations of stator 1, R implies S_R (iteratively) until stator 1 offsets after an interval from onset. Without the brackets, the example would be very different:

$$\begin{tikzcd}\{ \ 01 & R \supset S_R & X & \theta\downarrow \ \} \arrow[ll, bend left] \end{tikzcd}$$

"During multiple presentations of stator 1, R implies S_R and the offset of stator 1, an interval of time after the occurrence of S_R (both S_R and $\theta\downarrow$ are on R)."

Following the process operations, it is necessary to distinguish probe operations, the operations carried out by the experimenter with the intent of making a measurement which will then be used to determine the outcome of the process operations that have been followed and from them, the effect of the experimental procedures.

The probe operation, then, is an operation that is carried out exclusively with the purpose of obtaining a measure of behavior. It should be noted that in many instances the probe operations may be the same as a process operation that is being carried on through the experiment, as for example, measurement of rate in simple operant conditioning.

PRE-PROBE AND PROBE GRAMMER

All rules specified above apply to the notation of baseline and probe operations. The same set of rules applies to both of these sets of operations.

All operations performed while measurements are being made are baseline (before process) or probe (after process) operations. They are enclosed in vertical brackets, "‖". For example, in a form of classical conditioning, the initial response to S1 is measured, then it is paired with a stimulus that elicits a response, S2^{R}. Then, S1 is presented alone and the elicitation of RS2 by S1 is measured (the R similar to the R elicited by S2).

$$\nmid S1 \nmid \qquad X \qquad \{ S1/S2^{R} \} \quad X \quad \nmid S1 \nmid_{A}$$

A "simple" avoidance operation would be noted:

$$| \{ \; (\quad 01 \quad [R \sim S_{A} \;] \; s \; \theta \} |$$

Note that in this example, the probe and the process are the same operation.

MODULANT-PARAMETERS

Parameters are listed according to three classes:

Condition Parameters are listed with stimulus terms (duration intensity, size, wavelength, etc.) and response terms (pressure required, distance, topography, etc.).

Process Parameters (number of repetitions, duration for which a dependency holds, schedules, intervals, etc.) are listed as part of the operation notation, as below. They were left out of previous notations for simplicity.

$$10 \{ \; S1 \quad \underset{RS}{X \; 01} \; \underset{FR3}{\{ \; R \ominus S_{R} \; \}} \quad \underset{20S}{X \; \theta \}} \; \}$$

Here, 01 followed S1 by five seconds (use "s" and "m" for second and minute, "ft" and "in" for foot and inch, rather than the symbols ' and ".) R implies S on a Fixed Ratio-3 schedule during stator 1 which has a duration of twenty seconds. This procedure is repeated ten times.

A special case of parametric value for the ordering term "then" (X) should be noted. In many cases one event will follow another "immediately" or "instantaneously.". That is, a negligible duration of time, at least for the experimenter. Record this with the symbol "X" in the absence of a specified interval.

Parametric values are also recorded for two special cases of $\bar{S}$ and $\bar{R}$. If an event is dependent upon a $\bar{R}$ of a specified duration (specified minimum or maximum value, between limits, etc.) that interval is recorded. If the occurrence of an event or events other than a specified S ($\bar{S}$) is for a specified duration, it is recorded as in the example below.

$$1 \; hr \quad \{ \quad \underset{5S}{(\; \bar{R} \supset S \;)} \quad v \quad \underset{10S}{(\; R \supset \bar{S} \;)} \; \}$$

14.0 Independent Variables - Values: The independent variables of the experiment are to be written out in longhand for each group of the experiment. Different groups are labelled with Roman numberals.

14.1 An experiment was designed to test the length of time it took children of differing ages to habituate to a loud tone. Four age groups of children were tested: 8 months, 1 year, 16 months and 2 years. The independent variable in this experiment is age of the subjects and this independent variable should be annotated as:

I - 8 months old subjects

II - 1 year old subjects

III - 16 months old subjects

IV - 2 years old subjects

This numerical labelling of subjects should be consistent and used throughout the analysis sheet. In the example given above the same numerical labelling of the subjects should also be employed in (3.1) Age.

14.2 In some experiments only one group is employed and comparisons are made on the basis of that one group. For example, an experiment was designed to test the effects of two different types of verbal reinforcement on word memorization. A group of ten first graders were used. The independent variable was the two different types of reinforcers. This should be annotated as:

One Group [verbal reinforcement (S1) See 12.0
verbal reinforcement (S2)

15.0 PROBABILISTIC VALUES

15.1 Relationship and ordering terms may be modified by being encircled, indicating that its relationship is other than simple, continuous, and direct. This is common in schedules of reinforcement when R and S_R are related in many defined dependencies other than continuous reinforcement. In these cases, the definition of the relationship is given in this space. If more than one of the same ordering terms is used, with different definitions, they are distinguished by numeric subscripts, as below.

$$1\ \text{hr}\ \{\{\ R1\ \underset{1}{\textcircled{$\supset$}}\ S_R\} \ .\ \{\ R2 \underset{2}{\textcircled{$\supset$}} S_R\}\}$$

13.0 (Process)

15.0

$\textcircled{$\supset$}\ 1 = \text{FR } 3$
$\textcircled{$\supset$}\ 2 = \text{VI } 2\text{m}\ \ (r = .45\ \text{m})$

Dependencies are not the only kinds of relationships that may be probabilistic. For example,

13.0 $\{\ S1 \textcircled{,}\ S2 \textcircled{,} S3\ \}$

15.0 $\textcircled{,}$ = random orderings of S1, S2 and S3 with the provision that no S occurs more than three times in a row, or any sequence of 2 or 3 occur more than twice in a row (e.g., 1-2-3-1-2-3, or 2-3-1-1-2-3). All relationships and ordering terms can be modified in this way and described in this category.

16.0 Sequencing Rules

16.1 If two or more events (stimuli, sets of stimuli, operations or dependencies) are ordered in special sequences for which there are definable rules, the events are enclosed as below, and the sequence is defined under Sequencing Rules. Standard sequences (as in psychophysics) may be referred to by name, but only if they are truly standard.

For example, $\langle S^{\$1-26}\ \$S21 \rangle$

13.0 (Process Op)

12.1 (S measures) where

$S^{\$1-26}$: 100-600 cps tone of one sec. duration

$S^{\$21}$: 500 cps from above set

Sequence (defined under 16.0 Sequencing Rules) =
One S from $S^{\$1-26}$ presented 0.5_s before $S^{\$21}$. S from $S^{\$1-26}$ randomly selected except that no value of cps is repeated within three presentations of S from $S^{\$1-26}$.

16.2 In some cases more than one operation is used with the same subject or group. For example, if a subject was first punished, next positively reinforced, and thirdly, extinguished. If this sequence was repeated but always in the same order, than the entry in 16.0 should be op I X op II X, op III invariably. See 13.0 for operations.

17.0 Procedure Parameters

Repetitions and durations of procedures are to be reported in this section. There are three main categories of procedure parameters which should be reported; trials, blocks, and sessions.

17.1 A trial is defined as one time through the process operation; i.e., the procedure that gets repeated. In instrumental procedures the organism is not free to make the enumerated response at all times. The experimenter, therefore, determines when the process operation will be repeated for the organism. In these cases the experimenter defines the trial by the fact that he controls when one procedure is completed and when the next starts. In operant procedures the organism is free to make the enumerated response at all times. In these cases there is no set definition of a trial because the organism controls the end of one procedure and the beginning of the next. Operant cycle is the time used to describe the fact that the organism has gone one time through the enumerated procedure. In operant cases the word operant should be written after (17.1) trial. In instrumental cases the number of trials, duration of trials, duration of inter-trials (ITI) and whether or not the ITIs were consistent or variable should be written after (17.1) trial. Remember that the ITI is calculated from the end of trial _n_ to start of trial N + 1, not start to start.

17.11 For example, an experimental measure was responses to a manipulandum. The manipulandum was presented to the organism for 5 minutes followed by withdrawal of the manipulandum for 10 minutes, followed by presentation of the manipulandum for 15 minutes, followed by withdrawal for 30 minutes, and representation for 20 minutes. The entry in 17.1 would be as follows:

Trials - Number; 3, duration; 5 minutes, 15 minutes, 20 minutes.

ITI; 10 minutes, 30 minutes, ITI variable

If the manipulandum was always present than the entry after 17.1 would be as follows:

17.1 - Operant

17.2 Blocks: In many experiments groups (blocks) of trials are separated from each other by a longer time interval than any single ITI interval. For example, suppose an organism is presented with a stimulus every 10 seconds for 50 trials and then 30 minutes elapse before the stimulus is presented again. The ITI in this experiment is 10 seconds, there are two blocks, the inter-block-interval is 30 minutes and the number of trials per block is 50. All of this information should be written after 17.2 blocks. Trials are not always grouped into blocks. If they are not, than Not applicable should be written after 17.2 blocks.

17.3 Sessions: Blocks of trials are sometimes separated by an interval greater than any single IBI. This is the defining characteristic of a session. In the above example suppose that after the second block of trials that 22 hours elapsed before the procedure was employed again and that the entire experiment lasted 7 days. There would be 7 sessions, the ISI would be 22 hours and there would be 2 blocks per session. All of this information should be entered in 17.3. In many experiments a series of trials with a specific ITI are carried out each day and then a longer period of time than any single ITI elapses before the trials are carried out again. The period separating the series of trials defines the block. If there is not yet another interval greater than the IBI than blocks=sessions should be written after 17.3 sessions and all other parametric information should be written in 17.2 and 17.3. For example, if reinforcement was presented to a subject for 5 trials with a ITI of 20 seconds and then 24 hours later the reinforcement operation was carried out for 5 further trials, the IBI would be 24 hours as would the ISI. The analysis sheet for the entire procedure parameter section would be completed as follows:

17.1 trials: Number: 5, duration; Not reported, ITI; 20 minutes ITI; consistent

17.2 Blocks: Number: 2, duration; NR, IBI; 24 hours

17.3 Sessions: Blocks = sessions

OUTCOMES

There are three classes of outcomes: changes from pre-probe to probe measure for each group, comparisons between groups, and changes in categories that are dependent on outcomes. The latter type of outcome is described in terminological outcome 8.0.

18.0 Group: Comparisons of measures taken at pre-probe and probe for each group compared with itself. The p value is noted.

19.0 Comparative: Group measures taken in the probe are compared on the basis of statistical test of the relationships of "greater than","less than", "not equal", or "equal". The p value is noted.

18.0 OUTCOME (BY GROUPS)

The change in measure from pre-probe to probe is recorded for each group. It is notated in terms of direction, rate and magnitude of change (many outcomes are based on a comparison of two single measures and have no rate of change).

The following symbols are used:

	↑	increase	↑{R1} ↑{L1}	($p < .05$ - Mann-Whitney)
	↓	decrease	↓{R1} ↓{L1}	($p < .10$ - T test)
direction:	↑↓	increase, then decrease (any combination)	↑↓{R1} ↑↓{L1}	($p < .05$; $p < .01$ T)
	≃	no change	≃{R3} {L,3}	($p > .35$ - T test)
rate:	+	positive acceleration	$\{R1\}^+$	
	-	negative acceleration	$\{R1\}^-$	
	o	linear	$\{R1\}^o$	
magnitude	↑	Change in measure by less than or equal to a factor of one	↑{R1}	($p < .10$-F)
	↟	by factor of $> 1 \leq 2$	↟{R1}	($p < .05$ - T test analysis)
	⇞	by factor of ≥ 2	⇞{R1}	(no stat. test)

18.1 In all cases when comparisons are made against specific baselines, the baselines must be described. For example, suppose an experimenter reported an increase in the number of responses $\{R1\}_n$ as a result of making candy contingent on responding. The increase was relative to pre-reinforcement operant level responding. This should be reported as follows: $\uparrow\{R1\}_n$ $p < .05$ Relative to operant level.

19.0 Comparative Outcome: The following notation is used to annotate comparisons between group probe measures.

"$>$"	greater than
"$<$"	less than
"$\neq$"	not equal
"$\simeq$"	equal (approximately)

The roman numeral notation for each group in the section Independent Variables is used in referring to the groups.

For example:

$\text{I} \underset{.01}{>} \text{II}$	Group I greater than group II on the probe measure at the .01 level.
$\text{I} \underset{.05}{\simeq} \text{II} \underset{.05}{>} \text{III}$	Group I is equal (i.e., not significantly different) to group II, they are both greater than group III on the probe measure at the .05 level.
$\text{I} \underset{.05}{\simeq} \text{II} \underset{.05}{\simeq} \text{III};\ \text{I} \underset{.01}{<} \text{III}$	Group I is equal to group II, group II is equal to group III, group I less than group III at the .01 level.

If groups are compared on more than one measure, (trials to criterion, errors, amplitude, etc.), the comparisons are made separately and are notated as follows:

$$\{R\}_A:\ \text{I} \underset{.05}{\simeq} \text{II} \underset{.01}{>} \text{III}$$

$$\{R\}_{tc}:\ \text{I} \underset{.05}{>} \text{II} \underset{.01}{>} \text{III}$$

August 24, 1970
University of Tennessee
Op. An. W.S.V.

Appendix E-1

MANUAL
for
OPERATIONAL ANALYSIS

This manual is prepared to enable its user to apply the methods of operation analysis for the summary and evaluation of reports of systematic observations and experiments in psychology. The analyst can summarize the experiment by entering pertinent information on a prepared fold-over sheet, which can, in turn, be summarized in more usual abstract form.

GENERAL PURPOSES

The analysis has been developed to further several purposes:

(1) to permit the editorial evaluation of each experimental paper by providing for systematic report on each decision that the experimenter has made - or, as limited by our present understanding of the variables determining behavior, should have made - in designing the experiment, and by summarizing each operation carried out by him that could determine the outcome.

When the analysis of a paper is completed, the summary should enable precise replication of the experiment. As the analyst will learn with experience, many papers omit certain information on the procedures carried out, sometimes because the variable is not pertinent, sometimes for brevity, and sometimes for inscrutable reasons.

(2) to permit the rapid retrieval of information on the effects of various variables on a given behavior or set of behaviors. A computerized reference system has been developed and a set of indexing entries for the conventional categories used by various indexing systems is provided. These are useable as they are presented, but they have inherent limitations.

An additional computer-compatible system for classification of experiments according to the basic reiterative procedures followed is under development and appears as an appendix to the manual.

The various headings of the analysis sheet are tailored to the eventual development of computer software that, in principle, should make retrievable any experimental finding on any variable.

(3) The long-range goal of the analysis is a more ambitious one: It is the recategorization of psychological knowledge on the basis of the operations carried out by the experimenter with respect to the behavior of the subjects independently of the experimenter's specific purpose in performing the experiment, of the theoretical context within which it was performed, and of the conventional (and often anachronistic) ways in which many able psychologists think about behavior.

This goal is provided for by a classificatory notational system that parallels the alphanumeric code referred to in 2 above, and by

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recording the functional analytic parts of behavior that enter into the experimental procedures separately from their specific physical identity and values. All information is preserved, but from this form procedural features emerge that might otherwise be obscured.

This analysis may show that an effect presumed to be due to one variable - for example, species-characteristic perceptual behaviors - is in fact attributable to another (in this example, the social isolation of the subjects).

(4) A final function of the analysis is planning experiments. Use of the manual and the analysis sheet through the design phase of an experiment enables the experimenter to confront and consider each of the kinds of decisions he will need to make.

EVALUATIVE FUNCTIONS

This manual, and its associated analysis sheets, have been developed with several years experience in analyzing reports of experiments published in a wide variety of journals and fields, and using varying methods. After successive refinements, the method shows itself able to exhibit in straightforward manner many of the limitations that must be placed on the significance and general ability of a given experimental outcome because of deficiencies in experimental design, methodology, or report. The use of the analysis sheet permits limitations to be identified that often elude the editor or reader of a paper who,being only human, sometimes fails to note the omission of significant information on details, or, carried away by the reporter's prose, sometimes accepts an irrelevant argument or a pointless statistic.

The analysis and the sheets on which it is displayed permit evaluation of a paper from the following points of view.

(1) completeness of report
(2) adequacy of selection methods
(3) choice and range of specific events to manipulate in carrying out an experiment
(4) precision of methodology
(5) complexity of method, and hence appropriateness as a basis for generalization
(6) completeness and selection of data

The analysis sheet leaves its user to his own devices in evaluating the relationship of the experiment and its results to the problem stated by the experimenter, the appropriateness of the experiment to a solution of a problem or test of a theory, and the effectiveness of his presentation of previous findings and discussion.

GENERAL METHODS

The index that follows this section presents the general order of the analyses and presentation. It should be noted that sections numbered

8.0 through 11.0 will be filled in last; their location is dictated by typographic necessity.

The following are general rules to be followed throughout:

(a) Brevity, clearness, and completeness are basic requirements. These demand legibility.

(b) The purpose is to be complete; omit no information needed to report this experiment. Fill every space, even if only with "not reported" (Sect. E below).

(c) Complete sentences need not be used.

(d) Many variables can and must be considered under more than heading. In these cases, -

> Enter the statement under the entry considered major and cross-reference _to_ the other entry. If neither is major, put full statement in _first_ entry. Then cross-reference _to_ the full entry from the second one.

(e) Where information is lacking, the missing information may fall into any of four categories:

(1) Does not apply
(2) It is not relevant
(3) Information is required, but is not found in the report, and
(4) The writing is unclear, so that the author's statement can be interpreted in more than one way.

The entries for the first three are "n.r." - _not reported_. The analyst should leave to the reader the decision whether the information is needed or appropriate.

For the fourth entry: "not clear".

****

In the detailed presentation that follows, examples and necessary conventions will be given.

Finally, the analysis form presented here is susceptible to further clarification and revision. Your suggestions are welcome, and your criticisms requested.

Two analysis sheets are presented before the manual's text. They will illustrate your goal in analysis, and may in fact be self-explanatory. The first states the entries in the vernacular; the second is the complete report of an experiment.

A Note on Notations

In sections 12 and 13, and in Appendix 4, the notational systems are presented. The former has been found useful in classifying experiments according to the paradigmatic operations. The novice is advised to write out the trial or cyclical procedures of an experiment in plain English until he has mastered the notations.

In Appendix 5 is an alphanumeric code designed for computer retrieval of experiments using various operations. It enables them to be spelled out in greater detail. The introduction to it will clarify its use.

APPENDICES

1. Analyses of Five Experiments
2. Definition of Terms
3. "Trouble-Shooting" - specific problems
4. The Notational System
5. The Alphanumeric Code

Appendix E-2

Operation-Analysis: April, 1969

Department of Psychology - The University of Tennessee

Class of Process

(1.0) **Reference**

(2.0) **Trad. Headings**

(3.0) **Selection Operations**: (3.1) Age ______ (3.2) N ______ (3.3) Groups ______

(3.4) Species-Genetic-Categories ______ (3.5) Sex ______

(3.6) Recruitment

(3.7) Behavioral Test

0) **Antecedent Operations** (4.1) Biocycles; Temporal Cycles ______

(4.2) Maintenance-Feeding

(4.3) Maintenance-Ambient

(4.4) Process Antecedents(Incl.S;$\bar{S}$)

(4.5) Exper. History, Other

(4.6) Instructions-Shaping (S, O, R, Rx - Inf.;Pretraining)

(4.7) Non-Process Instructions (Incl. Outcomes)

(5.0) **Conditions Within** (5.1) Biocycles; Temporal Cycles ______

(5.2) Time

(5.3) Apparatus

(5.4) Location-Situation

(5.5) Ambience-Microclimate (App.)

(5.6) Maintenance-Feeding

(5.7) Maintenance-Ambient

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12.0 Conditions of Experiment

(12.1) S's, O's, and S & O Specifications and Measures

13.0 Process Procedures

(13.1) Pre-Probe, (13.2) Process, (13.3) Probe and (13.4) Measurement Operations

---

14.0 Independent Variables - Values:

15.0 Probabilistic Values:

16.0 Sequencing Rules:

17.0 Procedure Parameters:

(17.1) T/B
(17.2) B/Session
(17.3) ITI
(17.4) IBI
(17.5) ISession I

18.0 Outcome:

19.0 Comparative Outcome:

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(12.2) **R's, L's, and R & L and Measures**

(12.3) **Implicative Identity and Specification**

6.0 Physical State: (6.1) Body Measures ____

(6.2) Surgical

(6.3) Biochemical (Horm.-Pharm.)

(6.4) Nutritional

7.0 Design-Data Analysis:

(7.1) S's Run By ____

(7.2) Data Selection

(7.3) Statistical Techniques "Exper. Design"

(7.4) Pilot Experimentation

8.0 Terminological Outcome

9.0 Other Outcome (incl. Non-behavioral)

10.0 E's Purpose and Summary

11.0 Comments

Appendix E-3

OPERATIONS ANALYSIS
DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF TENNESSEE
1972

1- REFERENCES

1.1 Title

1.2 Traditional References

2-SUBJECT SELECTION

2.1 Age

2.3 Number

2.5 Recruitment/Acquisition

2.2 Species

2.4 Sex

2.6 Grouping

2.7 Group Assignment

2.8 Behavioral Testing

3- ANTECEDENT OPERATIONS

3.1 Bio-cyclical events

3.2 Feeding

3.3 Ambience

3.4 Subjects History

3.5 Specific Experiment Related Histor,

3.6 Pretraining/Instructions

4-MAINTENANCE UNDER EXPERIMENTAL CONDITIONS

4.1 Time (exact)

4.2 Bio-cyclical events

4.3 Feeding and Maintenance

4.4 Experimental Space

4.5 Apparatus

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5- PHYSICAL STATUS AND MANIPULATION

5.1 Physical Description

5.2 Nutritional Considerations

5.3 Experimental Surgery

5.4 Biochemical (Hormonal- Pharmacological) Interferences

5.5 Pathological/Histological Analysis

6- DESIGN AND ANALYSIS

6.1 Identification of Nonsubjects Involved

6.2 Data Selection

6.4 Experimental Design

6.3 Data Analysis Techniques

6.5 Pilot Experimentation

7- IDENTIFICATION OF STIMULI, RESPONSES AND DEPENDENCIES

7.1 Stimuli

7.2 Responses

7.3 Dependencies

8- PROCEDURES

8.1 Pretreatment or Baseline Measures	8.3 Techniques used to Obtain Data (Probes)

8.2 Treatments

8.4 Measurement

9- INDEPENDENT VARIABLES

9.1 Identification

10- PROBABILITY OF OCCURANCE

10.1 Identification

11- SEQUENCING RULES

11.1 Identification

12- PROCEDURE PARAMETERS

12.1 Identification

13- OUTCOMES

13.1 Intra or group treatment

13.2 Comparative

13.3 Terminological

13.4 Side Effects

14- PURPOSE

14.1 Introduction

14.2 Discussion

14.3 Summary

15- EVALUATIVE COMMENTS

15.1 Evaluation

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Appendix E-4

[illegible]FERENCE CODE

Operation-Analysis: April, 1969

OPERATION CODE

Department of Psychology - The University of Tennessue

Use of Process

[illegible]radigmatic-operations
process-operation

[illegible] Reference

[illegible] citation; APA [illegible]

[illegible] Trad. Headings

[illegible] Selection Operations [illegible] of [illegible] number of subjects [illegible] How many? No. in g[illegible] How assigned? (All w[illegible] (All who started, incl. dropouts) [illegible] finished.)

(4) Species Genetic Categories [illegible] Species of subject; strain when specified; of humans, identify in group [illegible] Number of males and females, if applicable

[illegible] Recruitment

How did subject come to serve in experiment?

[illegible] tests, and assignment to group. [illegible]

What tests were used to select subjects before entry into experiment. What test data available, if not used in selection. What scores, if any, were used to assign individuals to each group.

4.0: Antecedent Operations [illegible] (4.1) [illegible] Season of year, relative or oestral cycle [illegible] over whole period of experiment or observation.

4.2: Maintenance Feeding

Daily routine of food and water, etc. before experiment began. Both long range and short range.

(4.3) Maintenance Ambient

What circumstances did subject live in before being in experiment? Living at home? Hospital? Cage? Living freely?

4.4: Process Antecedents (Incl. S[illegible]) Any previous experience with the specific details of environment, and specific behaviors or procedures carried out in the experiment.

(4.5) Exper. History [illegible] All features of the individual's previous history related to the experimental problem (includes the problems brought by subject to experiment).

[illegible] Instructions-shaping [illegible] Pretraining [illegible] How was the subject brought to be able to carry out the specific procedures of the experiment? What made it likely that he would do the particular things carried out in the experiment?

[illegible] Non-Process Instructions (incl. Outcomes) How was he made to "really try"? Was he told how well he should do? (Don't apply this to animals) - except "priming stimuli".

(5.0) Conditions within [illegible] (5.1) [illegible] Temporal Cycles At what time of day; or in what part of feeding or sleeping, or oestral cycle were subjects run?

(5.2) Time

Minute, hour, day, month when S's run

(5.3) Apparatus

What kind of gear? Standard? Special? Tests, forms, etc.

[illegible] Location-Situation

In a lab? At home? In a "live-in" Skinner box?

[illegible] Ambience Microclimate [illegible] What is the [illegible] immediate environment like? Cooled? Lighted?

[illegible] Maintenance Feeding Feeding routine during [illegible], time [illegible] with respect to daily [illegible]

(5.7) Maintenance Ambient Like (4.3), - but what [illegible] living conditions over the period [illegible]

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Conditions of Experiment

(8.1) S's, O's, and S & O Specifications and Measures

List identification of each event or object, i.e., each stimulus that appears in the operations, including probe stimuli. For each, state its physical specification (include measures, if possible), and any psychological measure, if any is reported.

Below this line, spaced vertical lines may be drawn as needed, so that each experimental group can be reported in the columns made by the line.

Process Procedures

(9.1) Pre-Probe, (9.2) Process, (9.3) Probe and (9.4) Measurement Operations

What is often called the "procedure".

9.1 Measures of behavior before training or other reported operations began.

9.2 Process - the procedure as a trial, or operant cycle. The operation that is repeated vis a vis each subject. A paradigmatic operation, or condition thereof.

9.3 The specific method followed to produce a measure of the effects produced.

9.4 The measure used.

The foregoing stated in notational form, or, if necessary, in plain English.

13.0 Independent Variables - Values:

This section determines the position of the verticals that will divide the page into columns. In this section, state in each column the value of the independent variable(s) for the group of treatment. The independent variable may be in any of the sections 3.0-12.0 preceding.

10.0 Probabilistic Values: Any dependency that is varied between 1.0 and 0.00 is reported here.

11.0 Sequencing Rules: The rules followed in determining which particular events or procedures will follow which others, when or where are used: Are stimuli presented randomly, or in

---

12.0 Procedure Parameters:

T (12.1) T/B
R (12.2) B/Session
I (12.3) (T)
A (12.4) (B)
L (12.5) (Session)
S

O 12.1
P. 12.2
C
Y 12.3
C 12.4
L 12.5
E

Details of procedure for reporting trials or operant cycles. For trials; number of trials per block, blocks per session, intertrial periods, etc. For operant cycles, duration of sessions, number of cycles per session if possible, and the blocks.

Outcome:

How did the response-measures change for each subject, group or treatment as a result of the process procedure, for each value of the independent variable? There should be an entry in each column. FOR GRAPHS, USE LOOSE SHEET. Label abscissal and ordinate scales, and give approximate form of curves. Tables may be added.

Comparative Outcome.

Comparison of results across page, of each subject, group or treatment.

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(§ 2) R's, L's, and R & L
and Measures

List identification of each response, locomotor response, and locomotion that appeared in the operations. Specify which are measured, and how. If a criterion is used, state it here.

(§ 3) Implicative Identity and
Specification

What are the consequences, if any? The dependency operations, if any, and their values. How controlled and delivered: mechanically? By S's arrival at, say, a goal box? By hand or voice?

---

der of magnitude? How about treatments?

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6.0 Physical State: (6.1) Body Measures Height, weight, and so on

(6.2) Surgical

What surgery, if any, has been carried out on the subjects, whether especially for the purposes of the study, or whether it was the basis for selection

(6.3) Biochemical (Horm.-Pharm.)

Were drugs or hormones systematically used in preparation or selection of the subjects for the experiment?

(6.4) Nutritional

Were there any controlled chang in diet?

(6.5) Histological Analysis. Methods of tissue preparatio Staining techniques; thicknes tissue cuts? (Etc.)

7.0 Design-Unit Analysis:

(7.1) S's Run By Senior author? Parents? Nurse? Junior author? Hourly Assistant? Who came in direct contact with subject?

(7.2) Data Selection Do the experimental procedures show that of 215 possible (and probably made) measures, only one is reported, and the rest forgotten? Did subjects who didn't complete the experiment have data reported (whether drop-out, non-starters, or dead). Were the data of all subjects reported, or if only those of selected ones, how selected?

(7.3) Statistical Techniques "Exper. Design" Analysis of Variance? Parametric? Groups compared? Statistical tests used? Kirk's Latin Square Design I? (Etc.)

(7.4) Pilot Experimentation Are preliminary experiments, performed by the writer of the article, reported on the basis of which he selected the final conditions and operations?

8.0 Terminological Outcome

Do the experimental results permit new statements, new uses of words, to be made?

7.0 Other Outcome (incl. Non-behavioral)

"Incidental observation". Things observed by the experimenter that were not expected. "Side effects". Weight loss? Hair color change? Attack? "Displacement behaviors", etc.

3.0 E's Purpose and Summary

The theoretical context in which the experiment was done; the experiment's stated purpose in the introduction.

.0 Comments Evaluative comments: Include completeness of report; complexity of procedures; adequacy or inadequacy of data for conclusions; i.e., Is it in your estimation a "good" or "bad" job?

Appendix E-5

A QUESTION GUIDE TO AID IN THE OPERATIONS ANALYSIS OF EXPERIMENTS (Form 1972)

Answers to the following questions when placed in the proper spaces provided on the Operations Analysis sheet will aid the author/reviewer in examining experiments.

1- REFERENCES

1.1 What is the full APA style citation? (Choose a title that could be an abbreviated abstract of the paper.)

1.2 What are the key words giving reference to recognizable bodies of the literature ? (These might be index entries)

2- SUBJECT SELECTION

2.1 What is the age of the subjects ? (As complete and accurate as possible)

2.2 What is the Species-Genetic identification of animals ? What is the social or other available categorization of humans ?

2.3 What is the total number and all important divisional subtotals of all subjects involved in the experiment ? (Indicate changes in total as they occur throughout the experiment)

2.4 What is the total number of each sex and all important subtotals for each sex involved in the experiment ? (Indicate changes in totals as they changes during the experiment)

2.5 How, when and where were the subjects obtained ?

2.6 How many groups were there ? How many subjects per group ? What was the number of subjects per group for which data were reported ?

2.7 How were subjects assigned to groups ?

2.8 What tests or criteria were used to select or to assign subjects ? What were the criterion scores or the reliability/validity data of the tests ?

3- ANTECEDENT OPERATIONS

3.1 What were the chemical, anatomical, imposed or natural envirnomental cycles under which the subjects existed before and during the experiment ? What was the duration of each of the same ?

3.2 What was the diet and feeding routine of the subjects before the experiment began ?

3.3 In what milieu did the subjects live before the experiment ?

3.4 What background did the individual subjects bring to the experiment ? (Include problems or other pertinent features)

3.5 What prior experience did the subjects have with the specific materials, apparatus and conditions of the experiment ? (Include all experience given to the subjects prior to the commencement of the experiment proper)

3.6 How were the subjects enabled to carry out the specific procedures of the the experiment ? What was said or done to make it likely that the subjects would perform according to the experimenters plan or expectations ?

4- MAINTENANCE UNDER EXPERIMENTAL CONDITIONS

4.1 When exactly was the experiment conducted ?

4.2 What changes in cyclical relationships (3.1) were made once the experiment had begun ?

4.3 What changes were made in the diet and feeding routine of the subjects once the experiment had begun ? What changes were made in the living milieu of the subjects once the experiment had begun ?

4.4 What were all the physical characteristics of the microclimate and micro-situation in which the experiment was conducted ?

4.5 What "things" or "gear" were used to conduct the experiment ? Who made them ? Were they standard, modified, or home brew ? (Be as detailed as possible as to the specific details of any piece of apparatus used)

5- PHYSICAL STATUS AND MANIPULATION

5.1 What were the physical identity of the subjects ?(Information as to size weight, eye color, etc; especially any specific anatomical or physiological characteristics which distinguish the subjects)

5.2 What manipulation or nutritional variables occured ?

5.3 What were the precise details of all surgical procedures performed ?

5.4 What usage of biochemical substances occured ? What were the dose rates? Who was the supplier ? What was the method of administration ? What was the routine of administration ?

5.5 What were the precise details of all post mortem, in vivo or in vitro analysis performed ?

6- DESIGN AND ANALYSIS

6.1 Who was involved in the experiment besides the subjects ? what did they do ? (Who ran the subjects, did the ststistics, wrote the program ?)

6.2 Which available measures were analysized ? Which were transformed ? How were they transformed ? Which were ignored ?

6.3 What were the names (and references) of all mathematical analytic techniques used ? What was graphically displayed ? How was the graphic display presented ?

6.4 What was the grand scheme or blueprint of the experiment ? (Diagram if possible)

6.5 What were the details of previously unreported (or unsuccessful) attempts to obtain these experimental findings ?

7- IDENTIFICATION OF STIMULI, RESOPNSES AND DEPENDENCIES

7.1 Identify the presumed behavior controlling objects or events by fully describing their nature and specifications ? (Physical, psychological psychophysiological measures)

7.2 What are the identities of all the events in the activity of the subjects presumed to result from the experimental manipulations ? (Include all criteria used to identify and measure manifestations of the same)

7.3 What are the identities of all relationships that occured as a consequence of a subjects activity ? (Include a description of how the dependencies were produced: socially, mechanically, electrically)

8- PROCEDURES

8.1 What were the techniques and procedures used to obtain pretreatment or baseline measures ? (Identify what they were by group and subgroup)

8.2 What was the orderly parade of stimuli, responses and dependencies (both in and over time) as they were presented to the subjects individually or by groups ? (This is the usual "procedure" on each trial or operant cycle)

8.3 What were the techniques used to enable the experimenter to obtain data ? (Probes)

8.44 What did the probes produce and how were their data translated into measurement ?

9- INDEPENDENT VARIABLES

9.1 What are the independent variables (and their values) for each group and treatment ?

10- PROBABILITY OF OCCURRENCE

10.1 What were the probabilities (percentages) of presentations or activities, trial by trial, cycle by cycle, session by session for groups and treatments ?

11- SEQUENCING RULES

11.1 What were the rules used to determine which particular events, procedures, or placements occurred when they did ? When were they used ?

12- PROCEDURE PARAMETERS

12.1 What were the number and duration of; trials per block, blocks per session, intertrial intervals, interblock intervals, intersession intervals, cycles per session, and sessions ?

13- OUTCOMES

13.1 What were the results when subjects or groups were compared to baseline or other reference bases ?

13.2 What were the outcomes of between group or between treatment level comparisons ?

13.3 Which outcomes permitted (allowed) new statements, or new terminological usage ? What are these new statements or terminologies ?

13.4 What was observed to have occurred (even though not measured) that the experimenter did not expect ? What was different (and noticed) from pre-experimental states of activity that did not fall within the scope of the experimenters plans ?

14- PURPOSE

14.1 What was the hypothesis of the experiment ? Against what background (theoretical) was it conceived and set up ?

14.2 How did the findings support (deny) the hypothesis ? What new questions were raised ?

14.3 Breifly encapsulate the findings, how they were obtained, and how they relate to theory (?)

15- EVALUATIVE COMMENTS

15.1 Reviewer's choice. What are your constructive criticisms ? What are your suggestions ? What is your overall evaluation ?

Appendix F

Op Anal Code

TABLE OF CONTENTS

Column		Title	Page
1		RESPONSE OR LOCOMOTION PRODUCTION	
2	S1	FIRST STIMULUS (ANTECEDENT)	
3	S2	PAIRING AND INTERMEDIATE STIMULUS	
4	[illegible]	I~~N~~DENTIFICATION OF SUBSEQUENT OR FINAL STIMULUS	
5	R	CLASS OF RESPONSE	
6		RESPONSE AND STIMULUS OPERATIONS	
6A		OBSERVATION AND PURE RESPONSE OPERATIONS	
6B		STIMULUS OPERATIONS - NO DEFINED TRIAL ("OPERANT")	
6C		STIMULUS OPERATIONS - (+TRIAL)	
7		SEQUENCING OF S's IN STIMULUS OPERATIONS (PAIRING)	
8		DEPENDENCE OPERATIONS	
9		REQUIREMENT FOR EXECUTION OF DEPENDENCE OPERATION	
10		DELAY AND DELIVERY OF S2	
11		COMBINATIONS , [illegible]	
12		INTER-TRIAL OR CYCLE INTERVAL [illegible]	
13		SUCCESSIVE OR SUPERIMPOSED OPERATIONS	
14		PROBE OBERATIONS	
15		RESPONSE MEASURED IN PROBE	
16		OPERATION OUTCOME	

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Operation Analysis
5/10/71
Column 1

RESPONSE OR LOCOMOTION PRODUCTION

OVERPUNCH

Only one	Wait and/or +
Demonstrate And -	Instruct and ±

Numeric Column

0. Wait
1. Stimulate (elicit)
2. Force; put through
3. Instruct
4. Shape
5. Autoshape
6. Demonstrate
7. Demonstrate and elicit
8. Shape and force
9. Other combination

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Column 2

FIRST STIMULUS (ANTECEDENT)

OVERPUNCH

Identification:

None Specified	Stimulus initially controlling R measured in probe +
Putative (includes habituated) -	Stimulus not initially controlling R measured in probe ±

Numeric Column

Class of Antecedent (S1)

0. Unspecified
1. Single: transient
2. Single: stator onset or offset
3. Single: stator
4. Single member of array: transient
5. Single member of array: stator onset or offset
6. Single member of array: stator
7. Two of array (includes simultaneously paired stimuli)
   See column C; this punch is coupled with C for pairing when any one of the array initially is + in the Column 2 OVERPUNCH.
8. >two of array (includes simultaneously presented array of stimuli)
9. E: an unanalyzed environment

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Column 3

PAIRING AND INTERMEDIATE STIMULUS

Temporal Relation of Si with Antecedent S1 or S2

OVERPUNCH

Pairing:

For no intermediate stimulus, punch - and 0
For simultaneous, punch .... or + in this OVERPUNCH, and number
7 in column 2 ; use [illegible]

	S1 with Si	Si with S2 or S1 with S2
Overlap	....	+
Successive	-	±

Numeric Column

Class of Intermediate S (Si)

0. Unspecified or none ← ([illegible])
1. Single: transient
2. Single: stator onset or offset
3. Single: stator
4. Single member of array: transient
5. Single member of array: stator onset or offset
6. Single member of array: stator
7. Two of array
8. >two of array
9. E

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5/10/71
Column 4

S2
IDENTIFICATION OF SUBSEQUENT OR FINAL STIMULUS

OVERPUNCH

None specified or Always precluded, so cannot occur	Stimulus initially controlling response measured in probe +
Putative; indeterminate relationship to response -	Stimulus initially not controlling response ±

Numeric Column

Class of S2

Column 8
(Dependence operation) further states response-concurrent or subsequent event as in "reinforcement", "feedback", "modern psychophysics", and "knowledge of results." These are all punched zero in this column.

0. a) Unspecified
   b) If +, then a second instance of S1; confirmation
   c) If ±, "knowledge of results"
   d) If -, amplification and transduction of R

1. Single transient

2. Single stator onset or offset

3. Single stator or E ("opportunity to behave")

4. Single member of array; transient

5. Single member of array; stator onset or offset

6. Single member of array; stator

7. >1 transient

8. >1 stator onset

9. >1 stator

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Operation Analysis
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Column 5

CLASS OF RESPONSE

OVERPUNCH

	Single response	A-response
Putative	....	-
Previously identified	+	±

Numeric Column

Response

0. Observer - Identified: exclusive of verbal. (All cases where records made by observers are employed. Includes responses that might be (but were not) recorded electrically or mechanically. Where physical recordings were not made. Include both demonstrated and putative judgmental responses.

1. Verbal: "open-ended" (These are all cases of observer-identified responses, but verbal.) Sentences; statements of Rorschach or TAT, writing, speaking, etc. Observer-identified.

2. Verbal - single identifiable pronounced or written words, statements, or nonsense syllables. Observer-identified.

3. Movement - physically recordable, identified on basis of muscle or gland action includes all response records ~~of~~ which are produced by transducers of various sorts.

4. "Autonomic". (Not distinguishable except by statement of experimenter from 3 above. A subset of 3 determined by physiological evidence of mediation by the activities of the autonomic nervous system.)

5. Manipulandum; Bars, levers, all responses identified by interaction with an object in the environment. These include responses distinguished from one another by IRT's.

6. Locomotor responses (Locomotion between two fixed points in environment, e.g. runway; includes turns in running wheel), when N turns yeild a subsequent stimulus.

Numeric Column

Locomotions

7. Locomotion 1 - movement from one point in environment to another; points not specified or variable, e.g. locomotion in open-field.

8. Locomotion 2 - e.g. running wheel, when stopping and starting yeild no subsequent stimulus.

Sets of responses

9. Behavior-Set. Aggregates of responses that have been demonstrated to be stimulus sets for observers. ("Disruptive behavior" is identifiable by observers, but has not been demonstrated to be a response-set. Hence, this is, recorded....9. It has not been shown to be a behavior set. "Attack" on the other hand, in the pigeon, is +9.

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Column 6

RESPONSE AND STIMULUS OPERATIONS

OVERPUNCH

Observation and Response-Operations Only (Use Col. 6A)	Stim. Operation Defined trial (Use Col. 6C) +
Stim. Operation No defined trial (Use Col. 6B) -	Stim. Operation Compound trial (as in "serial learning;" (Use Col. 7) ±

[illegible] and - identify operants, "free responding"
+ and ± define "instumentals"

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Column6

OBSERVATION: RESPONSE AND STIMULUS OPERATIONS

Which of three alternative codes is used, is indicated by the OVERPUNCH. These are:

A. Obervation; pure response operations, and

B. Stimulus operations, - operant

C. Stimulus operations, - fixed trial, and

The fourth possible entry, identifies compound trials, as in paired associate learning; where, trial includes a variety of pairs. These complex pairs are further specified in column7.

If stimulus operations only are carried out, as in pure stimulus operations, this is indicated by .... in dependence operations (column 8). If there is any other OVERPUNCH then it is a discriminal operation.

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Column 6A

COLUMN 6A (APPLIES IF OVERPUNCH IS BLANK)

OBSERVATION AND PURE RESPONSE OPERATIONS

Numeric Column

0. Does not apply; stimulus or dependent operations recorded elsewhere.

Observation — No process or stimulus operations; experimenter only observes and records behavior of S. Response production is notated in Column 1.

1. Continuously observe and record behavior of S (no trials; free operant).

2. Continuously observe and record behavior of S (trials by an interval of time; time sampling of behavior).

3. Observe and record behavior of S only in a specified situation (record behavior of S only when he is standing at the blackboard; or when rat is in the right corner of box in "field" observation.

4. Observe and record behavior of S only when the behavior of S being measured is accompanied by another explicitly identified behavior (measure verbal behavior of S while he is driving a car; measure squealing of rat while copulating).

Pure Response Operations

Operations including Response Production Method

5. Same as Response Production

6. Wait, then same as Response Production

Operation not carried out in Response Production

7. Block (environment)

8. Restrain; harness (subject)

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Column 6B

6B
STIMULUS OPERATIONS
NO DEFINED TRIAL ("OPERANT")
(All are Stators concurrent with R-instances)

Numeric Column

Basic Stimulus Operations, Instance-independent

0. None or constant (dependence operation only)

1. 01/02 single (includes time)

2

2. 01/02 array

3. 01 then 01, single

4. 01 then 01, array

5. Clock: 01=f(t)

Response-instance dependent Stimulus Operations carried out within Operant Cycle. (specified here from Column 8).

6. Fade in 0 until requirement for S2 met. (includes counter; 01=f(N_R))

7. Fade out 0 until requirement for S2 met.

8. Titration 0; fade in until requirement for S2 met, then fade out until requirement met, and reverse.

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Column 6C

STIMULUS OPERATIONS

(+Trial)
"Discrete Trial"
"Instrumentals"

Numeric Column

0. None (dependence operation only)

1. Single stimulus

2. Single S1 of array

3. Pairing (S1-Si), (S1-S2)
   ready signal; Pavlovian conditioning

4. Pairing Si-S2
   "Secondary reinforcement"

5. Pair S1 of array with S2 of array

6. Pair Sn in successive series with Sn +1

7. >1 S1; single response

8. >1 S1; with A-response

(note that 7 and 8 are redundant with the overpunch, Col. 5.)

9. >1 S1; e.g. disc. of number

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Column 7

SEQUENCING OF S's IN STIMULUS OPERATIONS (PAIRING)

OVERPUNCH

Rules of Sequencing Successive pairs:

Constant	Sequenced Arbritarily +
Randomized -	Sequenced by psychophysical scale ±

Pairings

S1	with	S2
or		or
S1	with	Si
or		or
Si	with	S2

1. Single with single
2. Single with single of array
3. Single with array
4. Single of array with single
5. Single of array with single of array
6. Single of array with array
7. Array with single
8. Array with single of array
9. Array with array

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Operation Analysis
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Column 8

DEPENDENCE OPERATIONS
and response or locomotion requirement for carring out operation. Requirement and S 2 correlations.

OVERPUNCH

None	Withhold or Preclude -
Present or Produce +	Terminate or Reduce ±

Numeric Column

Relation between Requirement and S2

0. No dependency operation and no relationship of S2 to R.

1. Dependency operation; no requirement.
   (S2 is a measure, record, or other transduction of R)

Relation of S2 to Response. Requirement specified.

S2 invariant

2. No Associated Stimulus Operation

3. Associated Stimulus Operation (see 6B)

S2 variable, independent of response

4. No Associated Stimulus Operation

5. Associated Stimulus Operation (see 6B)

S2 variable, positively correlated (positive f(R))

6. No Associated Stimulus Operation

7. Associated Stimulus Operation (see 6B)

S2 variable, negatively correlated (negative f(R))

8. No Associated Stimulus Operation (includes "Response-cost")

9. Associated Stimulus Operation (see 6B)

W. S. V.
Operation Analysis
~~5/10/71~~ 7/20/71
Column 9

REQUIREMENT FOR EXECUTION OF DEPENDENCE OPERATION

OVERPUNCH

Class of Requirement: REQUIREMENT, other

~~Responses~~
~~FR~~
~~Includes N=1~~
~~As in most~~
~~Instrumentals~~
~~....~~
~~VR~~
~~-~~

~~Interval~~ Temporal Stator
~~FI~~
~~+~~
~~VI~~
~~+~~

RESPONSE REQ

TEMPORAL STATOR	FR 1	FR >1	VR
FI * (ind. 0)	—	÷	±
VI	+		

If no dependence operation, code .... and 0.

* In fixed ratio, the FI reqemt is zero.

In instrumentals, – ~~I~~ the interval is here reported as zero; ~~but~~ is in fact given under ITI

Numeric Column

0. No requirement

1. One requirement only

[illegible]

2. One or more other requirements successive (same requirement class.)

3. One or more other requirements simultaneous (same requirement class)

4. One or more other requirements concurrent (same requirement class)

5. One or more other requirements successive (diff. requirement class)

6. One or more other requirements simultaneous (diff. requirement class)

7. One or more other requirements concurrent (diff. requirement class)

8 ~~Requirement changes as f~~ ~~Temporal~~ requiret changes as f(R)
9 Response requiremt changes as f(t)

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Column 10

DELAY AND DELIVERY OF S2

OVERPUNCH

Delay:

No S2	Si or S2 simultaneous with R +
S2 Immediately Succesive to R - [illegible]	S2 Delay ±

Numeric Column

Production Method

0. None

1. Mechanical-electrical

2. Experimenter-produced

3. Change-agent

---

4. Arrival at topographical point

5. Event physically produced by R, e.g., writing, or described by E (knowledge of results)

6. Non-controlled experimenter [illegible] environmental event; social or other behavior of second organism other than experimenter or change-agent; physical law; observation of consequent by subject.

---

7. Amplified, transduced R undistorted

8. Amplified, transduced R distorted

---

9. S2 second programed instance of S1 (may be S1 of next trial) (confirmation)

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COMBINATIONS

Trial Change
or
Recycle

Does not apply	~~U~~nlimited time for R?S2 "non-correction"; limited hold recycle new trial - is requirement not met
Unspecified -	Limited time for Rb S2 "correction" (recycle or new trial ~~only~~ when requirement met) ±

Numeric Column

When and Basis [illegible]

0. No combinations

1. Within trial or operant cycle; R-dep.

2. Within trial or operant cycle; R-indep.

3. Between and within trial or operant cycle; R-dep.

4. Between and within trial or operant cycle; R-indep.

5. Between trials or operant cycles; R-dep.

6. Between trials or operant cycles; R-indep.

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INTER-TRIAL OR CYCLE INTERVAL

OVERPUNCH

Immediate; no Interval between Trials or cycles	Interval is Variable +
Interval is Fixed from Preceding S1 (ITI)	Interval fixed, from Occurence of S2 (Record time-out here) -

Numeric Column

Combinations (cont'd.)

What and How

0. None
1. Requirement only: no second S
2. Requirement only: second S

---

3. Conditions only: S
4. Conditions only: R
5. Conditions only: R & S

---

6. Paradigmatic operations only: omit operation
7. Paradigmatic operations only: add or substitute second operation

---

8. Conditions and paradigmatic operations: omit operation
9. Conditions and paradigmatic operations: substitute second operation

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SUCCESSIVE OR SUPERIMPOSED OPERATIONS

R ? S
R

R > S
R ; S

OVERPUNCH

No second op.	Withhold, preclude, prevent S2: "Extinguish" Also adaptation* -
Second op. follows First. See next Card. +	Second op. superimposed in First. See next card. ±

Numeric Column

Second Operation

0. Change in probability of S2 only

----

1. Change conditions only; probe and return to 1 or stop experiment
   e.g. HIGHER ORDER CONDITIONING; Osgood Paradigm

2. Change conditions only (reverse); probe and return to 1 or stop
   e.g. REVERSAL OF DISCRMINATION

3. Change operations only; probe and return to 1 or stop
   e.g.

4. Change conditions and operations; probe and return to 1 or stop
   e.g. SENSORY PRECONDITIONING

----

5. Change conditions only; third operation follows
   e.g. "LEARNING SET", mediation

6. Change operations only; third operation follows

7. Change conditions and operations; third operation follows

----

8. Superimposed Second Operation; measure same R ([illegible])

9. Superimposed Second Operation; measure other R

----

*In adaptation ("Habituation") of any species-characteristic behavior, steps often must be taken to prevent a consequent stimulus. These will have been recorded ____________ and 0 in Column 8, and ...., and 6, in Column 10.

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Column 14

PROBE OPERATIONS

The OVERPUNCH specifies when the probe is made; here it covers retention studies.

OVERPUNCH

Time of Probe	
Continuous, running	At interv~~er~~als throughout the Process operations +
Immediately following Process operations (Not greater than ITI) -	After an interval greater Than ITI ("Retention") ±

Numeric Column

0. Selective observation and measurement.
1. Presentation of antecedent event from process-operation - (S1).
2. Presentation of an intermediate event from process-operation(Si).
3. Presentation of any other stimulus event from process-operation other than antecedent event (S1).
4. Presentation of antecedent array-member from process-operation.
5. Presentation of any array-member from process-operations other than antecedent event.
6. Presentation of any transient not used in process-operation.
7. Presentation of any stator not used in process-operation.
8. Any stimulus event (or array-member) from process-operation presented with any other stimulus event (or array-member) not from process operation.
9. Any other probe operation, complex unalyzed probe, e.g., therapists interview.

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Column 15

RESPONSE MEASURE~~D~~ IN PROBE

OVERPUNCH

The OVERPUNCH here states whether there was a second response measured, or second measure of same response.

No other response	Measures of other Responses -
Other measures, Same response +	Additional measure~~s~~, This and other responses ±

Numeric Column

Locomotion

0. Locomotion Measure - (e.g. distances in open-field; total # turns in running wheel, when no dependency exists.)

Measures made on each instance; these may be averaged

1. Instance-Measure - No stimulus
   amplitude, duration tension, etc.

2. Instance-Measure - Stimulus
   latency (includes IRT measures - where antecedent R is treated as stimulus) and each is recorded.

3. Instance-Measure; Assignment of Word or Number by Experimenter or Panel of Judges.

Measure requiring that a number of instances occur, before a measure can be made.

4. Set-Measure - No stimulus
   rate

5. Set-Measure - Stimulus (NR/NS)
   Relative frequency

6. Set-Measure - N_{R1}/N_R
   Relative frequency

"TRIALS TO CRITERION"

7. Set-Measure Assignment of Word or Number by Experimenter or Panel.
   ("Very often"; "sometimes"; "usually")

Measures involving calculation transforming any of foregoing measures

8. Calculated Measure, other; always based on Set Measure N_R/N_R of Verbal L-response (by mathematical rule). Includes various discrimation indices, as well as test "scores".

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Column 15 (Cont.)

Numberic Column

Measures neglecti~~on~~ng specific responses made

9. Judgment measure; (usually summation of single instances; based on Experimenter's evaluation as "correct", "incorrect", "% correct" (lumps together measures of more than one response).

1.

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Column 16

OPERATION OUTCOME
(within S or within group)

[illegible]

OVERPUNCH

Direction of Change in Response Measure

No change	Decrease -
Increase +	Complex e.g. [illegible] ±

Numeric Column

Change in Measure related to

0. No comparis~~i~~on within S or of group outcome made, only value of dependent variable stated (e.g., no comparision with initial trials, etc.)

1. Indeterminate, unreported, or no measure antecedent to allow comparision.

2. Change (mathematically defined)

3. Measured Baseline (no operation)

4. Assumed Baseline

5. Measured Baseline (other operation) (e.g. as in conditioned suppression)

6. Initial trials or operant cycles

7. Other

Trials to criterion
+ MUST BE PUT IN

BASIS OF COMP (I.V.)

undef. variable no always the rule 6 trials or cycles

APPENDIX 6-1

FREQUENCY AND PERCENT OF ENTRIES IN OPAN CATEGORIES AND OPAN SUBCATEGORIES

Each OPAN Category is defined and followed by a tabulation of the frequency and percent of total number of entries of each OPAN Subcategory.

1. SELECTION OPERATIONS What the experimenter did to determine which individuals would serve as subjects and how they would be assigned to groups.

Age (3.11) Age of subjects; group age, time of life (prenatal, infant, juvenile, adolescent, adult, etc.).

		Freq.	Percent
0.	NR	5	3.0
1.	1 year old or less	8	4.8
2.	2 years old	2	1.1
3.	3 " "	8	4.8
4.	4 " "	15	8.9
5.	5 " "	18	10.7
6.	6 " "	8	4.7
7.	7 " "	11	6.5
8.	8 " "	20	11.9
9.	9 " "	13	7.7
10.	10 " "	15	8.9
11.	11. " "	10	6.0
12.	12 " "	4	2.4
13.	13 " "	13	7.7
14	14 " "	9	5.4
15.	15 " "	4	2.4
16.	16 " "	4	2.4
17.	17 " "	1	0.6
	Total	168	100.0%

How Age was specified (3.12)

0.	NR	5	3.0
1.	Exact age	104	61.9
2.	Mean	16	9.5
3.	Median	14	8.3
4.	Mid-Range	12	7.1
5.	This writer's estimation from Categories e.g., "First grade"-7 years	17	10.1
	Total	168	100.0%

Groups (3.3) How many groups? How namy subjects in each group? How were subjects assigned to groups? Include all who finished.

0.	NR	10	6.0
1.	1 group	143	85.1
2.	2 groups	1	0.6
3.	3 "	10	6.0
4.	4 "	3	1.8
5.	5 "	-	---
6.	6 "	1	0.6
	Total	168	100.0%

Categories (3.4) Species-Genetic-Categories. Generic Labels applicable to group membership or clinical diagnosis. Any special characteristics of human subjects not noted elsewhere.

Freq.	Percent		
17	10.1	0.	NR
1	0.6	1.	agorophobia
4	2.4	2.	anorexia nervosa
4	2.4	3.	anxious
11	6.5	4.	assaultive
1	0.6	5.	asthmatic
50	29.8	6.	behavior problem
4	2.4	7.	black
1	0.6	8.	bowel trained
4	2.4	9.	compulsive
2	1.2	10.	constipated
4	2.4	11.	crying
14	8.3	12.	delinquent
9	5.4	13.	dependent
3	1.8	14.	encopretic
19	11.3	15.	enuretic
1	0.6	16.	fainting
			fear of...
1	0.6	17.	ambulances
1	0.6	18.	bathrooms
1	0.6	19.	cars
2	1.2	20.	dark
2	1.2	21.	dogs
1	0.6	22.	furry objects - stuffed and alive
1	0.6	23.	noises, loud
6	3.6	24.	school
1	0.6	25.	snakes
1	0.6	26.	tests
1	0.6	27.	water
1	0.6	28.	fetishist
2	1.2	29.	fire-setter
1	0.6	30.	head-bumper
1	0.6	31.	homosexual
7	4.2	32.	hyperactive
2	1.2	33.	institutionalized
1	0.6	34.	masturbator
1	0.6	35.	Mexican-American
1	0.6	36.	motor retardate
1	0.6	37.	mute
3	1.8	38.	neurotic
1	0.6	39.	orphans
2	1.2	40.	regressed
1	0.6	41.	scratch self
6	3.6	42.	schoolwork poor
1	0.6	43.	seizures
4	2.4	44.	strange behavior (misc.)
8	4.8	45.	tantrums
1	0.6	46.	thief
2	12.	47.	thumbsucker
4	2.4	48.	tic
8	4.8	49.	truant from school
1	0.6	50.	vomiter
Total 227	135.1		

Sex (3.5) Number of males and females if applicable.

		Freq.	Percent
0.	NR	21	12.5
1.	Female	31	18.5
2.	Male	89	53.0
3.	Mixed - even	3	1.8
4.	Mixed - majority females	4	2.4
5.	Mixed - majority males	20	11.9
	Total	168	100.0%

Recruitment (3.6) How did subject come to serve in experiment? Where and when were the subjects obtained? Also "referral" since it is a method of obtaining subjects.

		Freq.	Percent
0.	NR	30	17.9
1.	Court	8	4.8
2.	E solicits	12	7.1
3.	Hospital	14	8.3
4.	Institution	8	4.8
5.	Parent	15	8.9
6.	Professional - psychologist, psychiatrist, speech therapist	4	2.4
7.	School	38	22.6
8.	Clinic or private practice	12	7.1
9.	Unspecified referral agent	28	16.7
10.	Camp	1	0.6
	Total	170	101.2%

Behavior Test (3.7) Any test or other systematic selection procedure used to select subjects for the experiment, whether a psychological test, or by school or college attendance, membership in a class, etc. All test data, whether or not used to select subjects for the experiment. If tests were used for assignment to groups then the scores or data used as criteria should be stated.

		Freq.	Percent
0.	NR	98	58.3
1.	Behavior rating	15	8.9
2.	Diagnosis without specifying tests	16	9.5
3.	Intelligence test	40	23.8
4.	Projective test	7	4.2
5.	Self-report, standardized test	3	1.8
6.	Situational test	3	1.8
	Total	182	108.3%

II. INDEPENDENT VARIABLE (14.0) The parameter values of the independent variable(s) for the treatment of individuals or groups. The independent variable may be in any of the OPAN Categories.

	Freq.	Percent
0. NR	2	1.2
1. Instructions	21	12.5
2. Measurement Operations	4	2.4
3. Process Operations	152	90.5
Total	179	106.5%

III. DESIGN - DATA ANALYSIS

S's Run By (7.1) Who came in direct contact with subject? Change-agent.

	Freq.	Percent
0. NR	10	6.0
1. Experimenter	55	32.7
2. Father	2	1.2
3. Institution staff	9	5.4
4. Mother	17	10.1
5. Nurses	6	3.6
6. Observers	35	20.8
7. Others	17	10.1
8. Parents, both	33	19.6
9. Peers	9	5.4
10. Teacher	46	27.4
11. Therapist	4	2.4
Total	243	144.6%

Data Selection (7.2) Were any measures made, but not reported? Did subjects who didn't complete the experiment have data reported (whether drop-out, non-starters, or dead) Were the data of all subjects reported, or if only those of selected ones. How selected?

	Freq.	Percent
0. NR	146	89.9
1. Reported	22	13.1
Total	168	100.0%

Design (7.31)

	Freq.	Percent
0. NR	16	9.5
1. Between groups	9	5.4
2. Within groups	24	25.0
3. Within subjects	105	62.5
4. Between subjects	-	---
Total	172	102.4%

Statistics (7.32)

	Freq.	Percent
0. NR	152	90.5
1. Analysis of variance	11	6.5
2. T-test	2	1.2
3. Non-parametric test	3	1.8
4. F-test	2	1.2
Total	170	101.2%

Pilot Experiment (7.4) Are preliminary experiments, performed by the writer of the article, on the basis of which he selected the final conditions and operations reported? How extensive were these preliminary experiments? Was it difficult to get the proper conditions?

	Freq.	Percent
0. NR	160	95.2
1. Reported	8	4.8
Total	168	100.0%

IV. PHYSICAL STATE

Body Measures (6.1) Height, weight, disease, structural defect, appearance, etc.

0. NR	148	88.1
1. Physical exam (health)	16	9.5
2. Physical exam (weight)	5	3.0
Total	169	100.6%

Surgical (6.2) What surgery, if any, has been carried out on the subject? Why was the surgery done? Includes irradation and other structural intervention.

0. NR	167	99.4
1. Reported	1	0.6
Total	168	100.0%

Biochemical (6.3) Were drugs or hormones systematically used in preparation or selection of the subjects for the experiment? Any measure of natural or induced biochemical state.

0. NR	158	94.0
1. Drugs	9	5.4
2. Saline shots	1	0.6
3. Blind	-	---
4. Double-blind	-	---
Total	168	100.0%

Nutrition (6.4) Were there any controlled changes in diet? e.g., avitaminosis; hyperphagia; body weight, if weight loss was used to control behavior.

0. NR	167	99.4
1. Reported	1	0.6
Total	168	100.0%

V. ANTECEDENT OPERATIONS What the experimenter does to prepare the subjects for the probe and process operations; the maintenances and/or treatment of the subjects before the experiment which fall outside of the experimental procedures.

Temporal Cycles (4.1) Chemical, anatomical, imposed or natural environments, or behavior changes that are recurrently time dependent, e.g., climatic cycle, season of year, light-dark cycles, weening, etc. To be taken over whole period of experimental observation.

	Freq.	Percent
0. NR	167	99.4
1. Reported	1	0.6
Total	168	100.0%

Maintenance - Feeding (4.2) What when and how of daily feeding before experiment began. Accustomed diet plus any change due to selection for the experiment.

0. NR	161	95.8
1. Reported	7	4.2
Total	168	100.0%

Maintenance - Ambient (4.3) What circumstances did subject live in before beginning the experiment?

0. NR	159	94.6
1. Reported	9	5.4
Total	168	100.0%

Process Antecedent (4.4) Any previous experience with the specific details of environment, and specific behaviors or procedures carried out in the experiment.

0. NR	139	82.7
1. Relaxation training	2	1.2
2. S used while change agent trained	3	1.8
3. Previous experience with stimuli	18	10.7
4. Previous experience with apparatus	4	2.4
5. Hierarchy development	1	0.6
6. Previous experience with simular experiment	1	0.6
Total	168	100.0%

Experimental History (4.5) All features of the individual's previous history related to the experimental problem (includes the problems brought by subject to experiment). Was he a subject in previous experiments?

		Freq.	Percent
0.	NR	115	68.5
1.	Previous psychological treatment	12	7.1
2.	Previous method of behavior control - persuasion coercion	21	12.5
3.	History of the problem i.e. social and family history	21	12.5
4.	No number #1	2	1.2
	Total	171	101.8%

Instruction to Change Agent (4.61) What was the change agent told to do? How was he told to do it?

		Freq.	Percent
0.	NR	69	41.1
1.	Change agent instructed to carry out Process Operation	62	37.0
2.	Instruction quoted	34	20.2
3.	Instruction written	7	4.2
4.	Helps decide on Process Operation	1	0.6
	Total	173	103.0%

Instruction to Subject (4.62) How was the subject brought to carry out the specific procedures of the experiment? What made it likely that he would do the particular things carried out in the experiment? To what degree was the subject informed on the stimuli, the responses he was to give, the relation between his performance and the consequences for him?

		Freq.	Percent
0.	NR	97	57.7
1.	Instruction quoted	30	17.9
2.	Instruction written	8	4.8
3.	Instruction given	33	19.6
4.	Helps decide on Process Operation	1	0.6
	Total	169	100.6%

Non-Process Instructions (4.7) How was he made to "really try"? Was he told how well he sould do? Was he "motivated" by comparing his performance to that of others?

	Freq.	Percent
0. NR	160	95.2
1. Reported	8	4.8
Total	168	100.0%

VII. CONDITIONS WITHIN THE EXPERIMENT Same as Antecedent Operations, but applies to period through which the Process Operation are carried out.

Cycles (5.1) At what time of day or in what part of feeding, or sleeping, cycle were sybjects run?

0. NR
1. Reported

	Freq.	Percent
(o. NR)	168	100.0

Time (5.2) Specific time when data was collected: minute, hour, day, month.

	Freq.	Percent
0. NR	70	41.7
1. Morning	16	9.5
2. Afternoon	8	4.8
3. Night	18	10.7
4. All day	26	15.5
5. Certain activity period	26	15.5
6. Fall	4	2.4
7. Winter	11	6.5
8. Spring	10	6.0
9. Summer	3	1.8
Total	196	116.7%

Apparatus (5.3) What kind of gear? Standard? S½ecial? Tests, forms, manipulanda, environments for locomotion, instruments for measurement or intervention, etc.

	Freq.	Percent
0. NR	74	44.0
1. Educational material	3	1.8
2. Equipment for delivery of implicative	24	15.5
3. Furniture	16	9.5
4. Recording equipment	29	17.3
5. Toys and other manipulanda for S's use	33	19.6
6. Observer room and window	6	3.6
Total	185	110.1%

VIII. CONDITIONS OF EXPERIMENT Stimuli, responses, and the dependency relations between them.

Stimuli Each event or object, - i.e., each stimulus that appears in the operations, including proble stimuli; its nature, physical specification (include measures, if possible), and any psychological or psychophysiological measures taken.

		Freq.	Percent
0.	NR	8	4.8
1.	Animal	3	1.8
2.	Bathtub	2	1.2
3.	Car	4	2.4
4.	Car, loss of	1	0.6
5.	Comic Books	1	0.6
6.	Desensitzation scenes	6	3.6
7.	E's face	4	2.4
8.	E helps	1	0.6
9.	Food or drink	17	10.1
10.	Grade	2	1.2
11.	Guitar playing	1	0.6
12.	Injections	2	1.2
13.	Instruction or command	24	14.3
14.	Light	9	5.4
15.	Money	6	3.6
16.	Money, loss of	2	1.2
17.	Mother	1	0.6
18.	Movie	6	3.6
19.	Noise-bell, tone, click	21	12.5
20.	Observe others touch animal	2	1.2
21.	Plaque	1	0.6
22.	Play	1	0.6
23.	Play, loss of	1	0.6
24.	Pleasant environment	2	1.2
25.	Punishment not specified elsewhere	5	3.0
26.	Question	1	0.6
27.	Radio	1	0.6
28.	Readings from a book	3	1.8
29.	Shock	3	1.8
30.	Sink	1	0.6
31.	Social attention, negative	15	8.9
32.	" " , neurtal	9	5.4
33.	" " , positive	93	55.4
34.	Spanking	4	2.4
35.	Special activity - trips, bowling	11	6.5
36.	Sprinkler	1	0.6
37.	Star	5	3.0
38.	Swimming permission	1	0.6
39.	Time out	16	9.5
40.	Time out - locked out of house	2	1.2
41.	Toilet	7	4.2
42.	Tokens, points, notes	27	16.1
43.	Tokens, points, loss of	7	4.2
44.	Toys	13	7.7
45.	Toys, loss of	1	0.6
	Total	354	210.7

Number of Stimuli (12.12)

	Freq.	Percent
0. NR	13	7.7
1. 1 stimulus	58	34.5
2. 2 stimuli	41	24.4
3. 3 "	31	18.5
4. 4 "	18	10.7
5. 5 "	5	3.0
6. 6 "	1	0.6
7. 7 "	1	0.6
Total	168	100.0%

Stimuli Outcome (12.13) Number of stimuli for which some outcome measure is reported.

	Freq.	Percent
0. NR	133	79.2
1. 1 outcome	2	1.2
2. 2 "	1	0.6
3. 3 "	-	---
4. 4 "	27	16.1
5. 5 "	2	1.2
6. 6 "	2	1.2
7. 7 "	1	0.6
Total	168	100.0%

Responses. What the subject did or where he moved to. Response measures, including criteria used to identify a response or a level of responding.

Freq.	Percent		
4	2.4	1.	Aggressing, physical
5	3.0	2.	Aggressing, verbal
2	1.2	3.	Agreement with suggestion
1	0.6	4.	Apologizing
			Approach...
1	0.6	5.	to ambulance
1	0.6	6.	to chair
2	1.2	7.	to school
4	2.4	8.	, social
32	19.0	9.	Appropriate; desirable, good
1	0.6	10.	Asking to use toilet
1	0.6	11.	Asthma attack
6	3.6	12.	Attending
2	1.2	13.	Attending, not
1	0.6	14.	Attending school
1	0.6	15.	Attending school, not
1	0.6	16.	Being late for school
1	0.6	17.	Bring matches to father
1	0.6	18.	Bumping head
1	0.6	19.	Choice of girl
1	0.6	20.	Choice of man
1	0.6	21.	Coming home late
2	1.2	22.	Coming home on time
2	1.2	23.	Complaining, somatic
6	3.6	24.	Completing chores
2	1.2	25.	Completing chores, not
4	2.4	26.	Completing school assignment
1	0.6	27.	Completing school assignment, not
3	1.8	28.	Complusive
1	0.6	29.	Contact with adult
14	8.3	30.	Cooperating
2	1.2	31.	Cooperative play
1	0.6	32.	Correct, not
2	1.2	33.	Correct spelling
1	0.6	34.	Correct spelling, not
4	2.4	35.	Crying
2	1.2	36.	Defecating in pants
4	2.4	37.	Defecating in toilet
4	2.4	38.	Delinquent
1	0.6	39.	Dependent
2	1.2	40.	Destructive
11	6.5	41.	Eating
1	0.6	42.	Eye blink
1	0.6	43.	Eye contact
			Fear...
3	1.8	44.	report of
1	0.6	45.	of animals
1	0.6	46.	of dark
1	0.6	47.	of dirt
1	0.6	48.	of dogs
1	0.6	49.	of noises
2	1.2	50.	of school
1	0.6	51.	Fetishism
1	0.6	52.	Fussing
1	0.6	53.	Frowning
1	0.6	54.	Head jerk
1	0.6	55.	Homosexual contact
1	0.6	56.	Hyperactive, not
1	0.6	57.	Immature
1	0.6	58.	Imcompatable with deviant, rebellious, or destructive
1	0.6	59.	Independent
4	2.4	60.	Instructing or commanding
3	1.8	61.	Isolate
1	0.6	62.	Jumping off couch
1	0.6	63.	Leaving home
2	1.2	64.	Leaving seat
1	0.6	65.	Looking at E
1	0.6	66.	Looking at E, not
1	0.6	67.	Looking at mother, not
2	1.2	68.	Looking at others
1	0.6	69.	Looking at toy accident
1	0.6	70.	Low probability
2	1.2	71.	Marble game
1	0.6	72.	Masturbating
1	0.6	73.	Masturbating, not
40	23.8	74.	Misbehavior: disruptive, deviant, inappropriate, objectional

Freq.	Percent		
1	0.6	75.	Neurotic
3	1.8	76.	Noise making
3	1.8	77.	Obeying commands
2	1.2	78.	Passive
			Play...
3	1.8	79.	appropriate
2	1.2	80.	by self
1	0.6	81.	fantasy
1	0.6	82.	in water
1	0.6	83.	next to others
4	2.4	84.	with specific object
2	1.2	85.	Pleasurable activities
1	0.6	86.	Popping balloon
2	1.2	87.	Proximity
1	0.6	88.	Pull out plug
1	0.6	89.	Rules, breaking
1	0.6	90.	Rules, keeping
1	0.6	91.	Scratching
1	0.6	92.	Seizures
1	0.6	93.	Setting fires
4	2.4	94.	Shouting and yelling
1	0.6	95.	Shutting off buzzer
5	3.0	96.	Sitting
1	0.6	97.	Sitting, not
2	1.2	98.	Sitting in cars
1	0.6	99.	Sleeping in own bed
4	2.4	100.	Smiling
1	0.6	101.	Smiling, not
3	1.8	102.	Social, neurtal
1	0.6	103.	Social, positive
2	1.2	104.	Socially acceptable
3	1.8	105.	Spontaneous
3	1.8	106.	Standing
1	0.6	107.	Staying outside 30 minutes
1	0.6	108.	Stealing
1	0.6	109.	Stealing, not
1	0.6	110.	Striking matches

Freq.	Percent		
9	5.4	111.	Studying
5	3.0	112.	Studying, not
1	0.6	113.	Stuttering
			Talking...
10	6.0	114.	talking
1	0.6	115.	"ain't"
4	2.4	116.	honestly
			Positively about...
1	0.6	117.	being independent
2	1.2	118.	eating
1	0.6	119.	vehicles
4	2.4	120.	Tantrum
1	0.6	121.	Task, oriented (in school)
6	3.6	122.	Test performance
2	1.2	123.	Thumbsucking
1	0.6	124.	Tic
1	0.6	125.	Toothbrushing
			Touch...
1	0.6	126.	child
1	0.6	127.	snake
2	1.2	128.	teacher
1	0.6	129.	Turning light off
3	1.8	130.	Turning light on
3	1.8	131.	Using toilet
1	0.6	132.	Verbal, new
1	0.6	133.	Verbal, old
1	0.6	134.	Vomiting
1	0.6	135.	Walking across a board
1	0.6	136.	Walking across a board, not
18	10.7	137.	Wetting bed
1	0.6	138.	Wetting pants
405	241.1		Total

Freq.	Percent	Putative Nature of Response (12.22)
1	0.6	0. NR
26	15.5	1. Putative Homogeneous: all stereotyped instances look alike e.g., spitting not under reinforcement control
224	133.3	2. Putative Heterogeneous: all instances may not look alike e.g., face touching, scratching nose, and rubbing eyes may function
122	72.6	3. Previously identified Homogeneous: e.g., scratching shown to be under reinforcement-control
---	-----	4. Previously identified Heterogeneous: e.g., interchangeable response class, reinforce one member of the class and all the other members are systematically affected.
373	222.0%	

Freq.	Percent	Response Class (12.23)
1	0.6	9. NR
213	126.8	1. Behavior set - thought to be class by observer. Heterogeneous - mixed category of two or more of the following, e.g. aggression may be both verbal and movement.
39	23.2	2. Verbal: "open'ended": Sentences; statements of Rorschach or TAT, etc. writing, speaking
6	3.6	3. Verbal - single. Identifiable pronounced or written words, statements, or nonsense syllables.
57	34.0	4. Movement - identified on basis of muscle or gland action: "stereotyped"; occur and identified independently of environmental object. Physiological responses; fixed action patterns, and the like.
38	22.6	5. Manipulandum; Bars, levers, all responses identified by an interaction with an object in the environment. These' include responses distinguished from one another by IRT's. e.g., licking, scratching
6	3.6	6. Locomotor responses (Locomotion between two fixed points in environment, e.g., runway; includes turns in running wheel).
		Choice Responses: Response sets, members of which are distinguished solely on where they take place.
7	4.2	7. Verbal - L-response. Response to tests, when only one R is permitted. Response to Probe-Instructions; Probe-Questions; "yes-no"; "agree-disagree"; "greater-less"; numberals; all responses on objective tests. All these yield Set-Measures to S. Computates
----	----	8. Manipulandum - L-response. Topographically identical except for place at which they occur; only one R can be made at a time. (e.g., press right bar vs. press left bar.)
----	----	9. Locomotor - response. Two or more locomotor responses topographically identical except for points to which subject moves. T-maze, Y-maze, jump to right door, jump to left door, etc.
		Locomotions
5	3.0	10. Locomotion - movement from one point in environment to another; points not specified but variable, e.g., locomotion in open-field.
372	221.4%	

Freq.	Percent	Response Measured in Probe (12.24)
15	8.9	0. NR Includes when another R is measured but the one here is reinforced, but not measured.
		Measures scored made on each instance; these may be averaged
2	1.2	1. Instance-Measure - No stimulus required to yield measure: amplitude, duration, tension, precision, intensity, etc. e.g., machine measures intensity of punch and takes average.
2	1.2	2. Instance-Measure - Stimulus required to yield measure: latency (includes IRT measures - where antecedent R is treated as stimulus) and each is recorded; after discharge (interval from S to R offset, or from 0 to R offset).
1	0.6	3. Instance-Measure; Assignment of Word or Number by Experimenter or Panel of Judges. e.g. E rates intensity of punch from 1 to 4, or E rates "Johnny pushes too hard".
		Measure requiring that a number of instances occur, before a measure can be made
171	101.8	4. Set-Measure - No stimulus required to yield measure: number: set number: subset burst-length rate burst duration incidence (one or more R per time unit) function of total duration (includes body weight). inter-R time/same R inter-R time/different Rs total duration latency of change in rate
5	3.0	5. Set-Measure - Stimulus (NR/NS) Relative frequency of R to S.
43	25.6	6. Set-Measure - N_{R1}/N_R Relative frequency with respect to other Rs.
72	12.9	7. Set-Measure Assignment of Word or Number by Experimenter or Panel. (Very often; sometimes; usually) Previously identified R, e.g., "hits often" may be with S or no S.
		Measures involving calculation transforming any of foregoing measures
4	2.4	8. Calculated Measure, other; always based on Set Measure N_R/N_S, of Verbal L-response (by mathematical rule). Includes various discrmination indices, as well as test "scores". e.g., scoring MMPI, Fleish readability formula.
4	2.4	9. Prose description.
---	---	10. Locomotion Measure: e.g., distances in open field, total # turns in running wheel.
		Measures neglecting specific responses made
5	3.0	11. Judgement measure (usually summary of single instances of 1-6; based on Experimenter's evaluations. e.g. "correct" or "incorrect", "right" or "wrong", and "% correct" on a spelling test or in paired associate learning.
324	133.3%	

Direction of response change (12.25)

Freq.	Percent		
21	12.5	0.	NR
4	2.4	1.	No change
84	50.0	2.	Decrease
64	38.1	3.	Increase
111	60.1	4.	Complex change, both increase and decrease at different times during the experiment.
284	169%		

Response Outcome (12.26) Change in response measure compared with one of the following

19	11.3	0.	Indeterminate, unreported, or no measure antecedent to operation
---	----	1.	Chance (mathematically defined)
73	43.5	2.	Measured baseline (no process operation)
73	43.5	3.	Assumed baseline
15	8.9	4.	Measured baseline. Compared to other operation. e.g. as in conditioned suppression.
5	3.0	5.	Initial trials or operant cycle. Operation 2 (1st min.) Vs operation 2 (last 5 min.)
---	----	6.	Other
15	8.9	7.	No comparision within S or of group outcome made, only value of dependent variable stated, e.g., no comparison with initial trials, etc., or to any other baseline or Process Operation. "Observe only" also goes here.
97	57.7	8.	Complex - compared with two or more of above.
6	3.6	9.	Comparisons of naturally occurring Process Operations
303	120.8%		

Implicative (12.3) What are the consequences of the subjects behavior, if any? How were the consequences controlled and delivered? By whom?

0.	NR	24	14.3
1.	E	33	19.6
2.	Father	1	0.6
3.	Institutional staff	10	6.0
4.	Mechanical - automatic	19	11.3
5.	Mother	17	10.1
6.	Nurse	4	2.4
7.	Parents	23	13.7
8.	Peers	9	5.4
9.	Teacher	41	24.4
10.	Mechanical - by hand	5	3.0
11.	Others	12	7.1
12.	Therapist	1	0.6
13.	Subject	1	0.6
	Total	200	119.0%

IX. PROCESS PROCEDURES

How all the components of the experiment were placed into the experimental design.

Baseline (13.1) Measures of behavior before training or other reported operations began.

		Freq.	Percent
0.	NR	81	48.2
1.	Reported	87	51.8
	Total	168	100.0%

Process Operations (13.21) How the stimuli, responses, and dependencies were sequenced in relation to one another, i.e., the experimental treatment. Process - the procedure as a trial, or operant cycle; The operation that is repeated vis a vis each subject.

0.	NR	1	0.6
1.	Instruction	50	29.8
2.	Single S or O presented	27	16.1
3.	S or O pairing	8	4.8
4.	R measured only	49	29.2
5.	More than one R measured only	76	45.2
6.	R ignored	59	35.1
7.	More than one R ignored	3	1.8
8.	One R implies one S	243	144.6
9.	One R implies more than one S	54	32.1
10.	More than one R implies one S	23	13.7
11.	More than one R implies more than one S	5	3.0
12.	One R precludes one S	5	3.0
13.	One R precludes more than one S	3	1.8
14.	More than one R precludes one S	--	-----
15.	More than one R precludes more than one S	---	-----
16.	S or O array	20	11.9
17.	S or O array pairing	4	2.4
18.	"Therapy" (Process Operation not specified any more exactly)	5	3.0
	Total	635	378.0%

Frequency of Concurrent Process Operations (13.22)

Concurrent				
0.	NR	2	1.2	
1.	1 OP	367	218.5	(only one)
2.	2 OP	100	59.5	
3.	3 OP	33	19.6	
4.	4 OP	8	4.8	
5.	5 OP	--	-----	
6.	6 OP	1	0.6	
	Total	511	304.2%	

Number of Successive Process Operations (13.23)	Freq.	Percent
Successive		
0. NR	1	0.6
1. 1 set of Process Operations	47	28.0
2. 2 sets " " "	33	19.6
3. 3 " " " "	28	16.7
4. 4 " " " "	29	17.3
5. 5 " " " "	14	8.3
6. 6 " " " "	7	4.2
7. 7 " " " "	6	3.6
8. 8 " " " "	3	1.8
9. 9 " " " "	-	---
Total	168	100.0%

Probe Time (13.31) When was the measure taken?

	Freq.	Percent
0. NR	2	1.2
1. Continuous running	114	67.9
2. At intervals through Process Operations	5	3.0
3. Immediately following Process Operations (Not greater than ITI)	8	4.8
4. After an interval greater than ITI ("retention")	51	30.4
Total	180	107.1%

Measure (13.4) Was any measurement taken?

	Freq.	Percent
0. NR	-	---
1. Reported	168	100.0
Total	168	100.0%

X. PROCEDURE PARAMETERS The repition and duration of experimental procedures.

Number of Sessions or Trials (17.1)

	Freq.	Percent
0. NR	47	28.0
1. One session	5	3.0
2. 1-10 sessions	21	12.5
3. 11-25 "	19	11.3
4. 26-50 "	37	22.0
5. 51-100 "	21	12.5
6. Over 100 "	17	10.1
7. To criterion	1	0.6
Total	168	100.0%

Length of Sessions or Trials (17.2)

0. NR	50	29.8
1. 1 hour or less	60	35.7
2. 1-4 hours	15	8.9
3. All day	26	15.5
4. All night	11	6.5
5. Certain time of day, but exact length not specified, e.g., mealtime	6	3.6
Total	168	100.0%

Inter Session Interval (17.3) Time between sessions.

0. NR	70	41.7
1. One day	60	35.7
2. Two or 3 days	17	10.1
3. 4, 5, 6 days	4	2.4
4. One week	6	3.6
5. More than one week	2	1.2
6. Less than 1 day	5	3.0
7. None (as in the case of one session)	3	1.8
8. In effect during waking hours	1	0.6
Total	168	100.0%

XI. PROBABILISTIC VALUES (15.0) Any dependency whose probability of occurance varies between 1.00 and 0.00. Comparison of results across groups or treatments. Statistical significance noted.

	Freq.	Percent
0. NR	116	69.0
1. Continuous reinforcement	15	8.9
2. Continuous reinforcement gradually changes to partial reinforcement	5	3.0
3. Delayed reinforcement e.g., R implies S after one hour	7	4.2
4. Partial reinforcement	20	11.9
5. Fixed ratio schedule	1	0.6
6. Variable interval schedule	3	1.8
7. Variable ratio schedule	2	1.2
Total	169	100.6%

XII. SEQUENCING RULES (16.0) The rules followed in determining which events or procedures will follow others. For example, are stimuli presented randomly, or in order of magnitude?

	Freq.	Percent
0. NR	2	1.2
1. "See Process Operations": means E determined order of Process Operation as given	93	55.4
2. Process Operations depend on which environment is present	4	2.4
3. Just 1 treatment, so no sequence	44	26.2
4. Baseline followed by Process Operation or Process Operation followed by Probe. Here baseline and Probe consist of measurement only	25	14.9
Total	168	100.0%

XIII. COMPARATIVE OUTCOME. Is the outcome measure from one group compared with the outcome measure from another group?

	Freq.	Percent
0. NR	157	91.7
1. Reported	14	8.3
Total	171	101.8

XIV. OTHER OUTCOME (8.0) " Incidental Observation". "Unexpected observations" "Side effects". Weight loss? Hair color change? Attack? Other behaviors change? etc.

	Freq.	Percent
0. NR	138	82.1
1. Other behavior change reported	30	17.9
Total	168	100.0%

3-18 ✓ Appendix G-2 24

N.R. ~~43%~~ 46
~~Reference~~
~~Seln Ops~~
~~3.1 Age~~
~~3.2 Numb~~
~~3.3 Grps~~
3.4 Catg
~~3.5 Sex~~
~~3.6 Recr~~
~~3.7 BchT~~
~~Indp Var~~
~~Dsn DAnl~~
~~7.1 SRun~~
~~7.2 DSln~~
~~7.3 Desn~~
7.4 PilE
Phys St
6.1 BdMs
6.2 Surg
6.3 Bich
6.4 Nutr
~~Antc Ops~~
4.1 CycL
4.2 MdFd
4.3 Mamb
4.4 PrAn
~~4.5 ExpH~~
4.6 Inst
4.7 Nprl
~~Cnd Wthn~~
5.1 CycL
~~5.2 Time~~
~~5.3 Apar~~
~~5.4 LocS~~
5.5 AmMe ✓
5.6 MnFd
5.7 MnAm
~~Cond Exp~~
~~12.1 S,O~~
~~12.2 R,L~~
~~12.3 Impl~~
~~Proc Pdr~~
13.1 BasL
~~13.2 Proc~~
~~13.3 Prob.~~
~~13.4 Meas~~
~~Prcd Prm~~
~~17.1 Numb~~
~~17.2 Lng~~
~~17.3 Isnl~~
Prbl Val
~~Seqn Rls~~
~~Outcome~~
Cmp Otcm
~~Oth Otcm~~
~~Comments~~

Bushell, D.J., Wrobel, P.A. and Michaelis, M.L. Applying group contingencies to the classroom study behavior of preschool children. Journal of Applied Behavior Analysis, 1968, 1, 55-61.

SELECTION OPERATIONS: Age: 4-3 years; 2-4 years; 5-5 years; 1-6 years. N: 12. Groups I. Sex: 10 female, 2 male. Recruitment: summer preschool. Behavioral Test: All scores above average on standard* intelligence test.

INDEPENDENT VARIABLES: Process Operations

DESIGN-DATA ANALYSIS: S's run by: teachers. Data Selection: 3 other children not considered because they did not come often enough. Design: within group comparison.

ANTECEDENT OPERATIONS: Exper. History: All had attended spring preschool and had experienced some form of token system.

CONDITIONS WITHIN: Time: 12:45 - 3:30 p.m. 5 days per week for 7 weeks. Last 20 class days used. Apparatus: large room adjoining the classroom afforded 1-way sight and sound monitoring of the class. Situation: Nursery school.

CONDITIONS OF EXPERIMENT: Implicative: Teachers gave consequences personally and by hand.

Stimuli	Responses & Measures
0 = tokens: colored plastic washers 1.5 in. diameter exchangeable for (1) a 30 min. outside event such as a short movie, trip to park (worth 15-20 0's) or a snack.	R1 = study behavior (count) R2 = nonstudy behavior (count) 4 observers made 14 observations (one every 5 min) on each of 12 Ss. This yielded 672 items of data each day.
RS = verbal praise	

PROCESS (PO) OPERATIONS:

PO 1: Each R1 implies 0 simultaneously. ✓ with RS: Each R1 and R2 measured.
PO 2: Each R1 implies 0 simultaneously with RS but 0 was no longer exchangeable for outside event or snack. Each R1 and R2 was measured.
PO 3: same as PO 1.

PROCEDURE PARAMETERS: Daily sessions, 2 3/4 hours per day for: PO 1: 9 days, PO 2: 7 days, PO 3: 4 days.

SEQUENCING RULES: See Process Procedures

OUTCOME: R relative frequency (n/N) measured each day: n = number of R1s, N = number of RIs plus R2s, i.e. 14 behaviors per child each day.

PO 1:
PO 2: less than PO 1
PO 3: greater than PO 1 and PO 2

OTHER OUTCOME: "As tokens become more valuable, theft, borrowing, lending (sometimes at interest) hiring of services and a variety of other economic activities were observed."

Bushell, et. al, 1968

E'S PURPOSE AND SUMMARY: Studying increases when it is rewarded with tokens which can be exchanged for trips or snacks.

COMMENTS: Behavioral Test: Which standarized intelligence test?

2.6 ✓

25

N.R. ~~48%~~ 46

- ~~Reference~~
- ~~Seln Ops~~
- ~~3.1 Age~~
- ~~3.2 Numb~~
- ~~3.3 Grps~~
- ~~3.4 Catg~~
- ~~3.5 Sex~~
- ~~3.6 Recr~~
- ~~3.7 BehT~~
- ~~Indp Var~~
- ~~Dsn DAnl~~
- ~~7.1 SRun~~
- 7.2 DSIn
- ~~7.3 Desn~~
- 7.4 PilE
- Phys St
- 6.1 BdMs
- 6.2 Surg
- 6.3 Bich
- 6.4 Nutr
- ~~Antc Ops~~
- 4.1 CycL
- 4.2 MdFd
- 4.3 Mamb
- 4.4 PrAn
- 4.5 ExpH
- ~~4.6 Inst~~
- 4.7 Nprl
- ~~Cnd Wthn~~
- 5.1 CycL ✓
- ~~5.2 Time~~ ✓
- 5.3 Apar
- ~~5.4 LocS~~
- 5.5 AmMe
- 5.6 MnFd
- 5:7 MnAm
- ~~Cond Exp~~
- ~~12.1 S,O~~
- ~~12.2 R,L~~
- ~~12.3 ImpL~~
- ~~Proc Pdr~~
- 13.1 BasL
- ~~13.2 Proc~~
- ~~13.3 Prob~~
- ~~13.4 Meas~~
- ~~Prcd Prm~~
- ~~17.1 Numb~~
- ~~17.2 Lng~~
- ~~17.3 Isni~~
- Prbl Val
- ~~Seqn Rls~~
- ~~Outcome~~
- Cmp Otcm
- Oth Otcm
- Comments

Carlson, C.S., Arnold, C.R., Becker, W.C., & Madsen, C.H. The elimination of tantrum behavior of a child in an elementary classroom. *Behavior Research and Therapy*, 1968, 6, 117-119.

SELECTION OPERATIONS: Age: 8 years. N: 1. Groups: 1 Categories: Negro, temper tantrums. Sex: male. Recruitment: Teacher requested help. Behavioral Test: Stanford-Binet, I.Q. average. Wide Range Achievement Test (mid-second grade). 1.8 reading, 1.2 spelling, 1.5 oral math.

INDEPENDENT VARIABLES: Process Operations

DESIGN-DATA ANALYSIS: S's run by: Teacher. Exper. Design: within S.

ANTECEDENT OPERATIONS: Instructions: To S: When you behave badly you will be held down in your chair. To class: Ignore tantrums and you will get a treat. Teacher instructed to carry out Process Operations.

CONDITIONS WITHIN: Time: March 14, 1966 to June 10, 1966. Situation: school.

CONDITIONS OF EXPERIMENT: Implicative: Teacher gave consequences personally according to Instructions.

Stimuli	Responses and Measures
01 = being held down	R = tantrum (count)
02 = stars	$\overline{R}$ = ½ day without tantrum

02 PROCESS AND PROBE OPERATIONS: Each R implies ~~S1~~ 01. Each $\overline{R}$ implies ~~S2~~, 4 of which entitle S and his classmates to a part with S passing out the treats. Each R measured.

PROCEDURE PARAMTERS: Each school day, all day, March 14 to June 10.

SEQUENCING RULES: See Process Procedures

OUTCOME: One R recorded on March 14, 21, 23, 3 on the 25th, and one on April 14, 19, 29. Teacher estimated that intensity of tantrums also diminished.

2-10 V

26

52
N.R. 48%
~~Reference~~ ✓
~~Seln Ops~~
~~3.1 Age~~
~~3.2 Numb~~
~~3.3 Grps~~
~~3.4 Catg~~
~~3.5 Sex~~
~~3.6 Recr~~
3.7 BehT
~~Indp Var~~
~~Dsn DAnl~~
~~7.1 SRun~~
7.2 DSIn
~~7.3 Desn~~
7.4 PilE
~~Phys St~~
~~6.1 BdMs~~
6.2 Surg
O ~~6.3 Bich~~ no value
6.4 Nutr
~~Ante Ops~~
4.1 CycL
~~4.2 MdFd~~
4.3 Mamb
O ~~4.4 PrAn~~ no value
~~4.5 ExpH~~
~~4.6 Inst~~
4.7 Nprl
~~Cnd Wthn~~
5.1 CycL
~~5.2 Time~~
5.3 Apar
~~5.4 LocS~~
5.5 AmMe
5.6 MnFd
5.7 MnAm
~~Cond Exp~~
12.1 S,O
12.2 R,L
12.3 ImpL
~~Proc Pdr~~
13.1 BasL
~~13.2 Proc~~
~~13.3 Prob~~
~~13.4 Meas~~
~~Prcd Prm~~
~~17.1 Numb~~
~~17.2 Lng~~
O ~~17.3 Isnl~~ no value
Prbl Val
~~Seqn Rts~~
~~Outcome~~
Cmp Otcm
Oth Otcm
Comments

Chapel, J.L. Treatment of a case of school phobia by recirpocal (pr) inhibition. Canadian Psychiatric Association Journal, 1967, 12(1), 25-28.

SELECTION OPERATIONS: Age: 11 years. N: 1. Groups: 1. Categories: "moderately severe school phobia..abdominal pains and vomiting...his behavior became so disturbing to the class that the authorities were forced to suspend him." Recruitment: after therapy failure. "It was at this point that it was decided to try a new and different approach to the problem." "referred in late September, 1963 because of more or less constant crying at home and at school.". Sex: Male.

INDEPENDENT VARIABLES: See Instructions and Procedure Parameters

DESIGN-DATA ANALYSIS: S's run by: E. Design: within S.

PHYSICAL STATE: Body Measures: "He was losing weight" "physical examination was within normal limits."

Exper. History

ANTECEDENT OPERATIONS: Feeding: "his appetite was poor". ~~Process Antecedents~~: "Onset of this 'disease' coincided with his move to a larger school in the city from a small, rural one-room school." ~~Exper. History~~: "failed to improve in spite of conventional one-to-one therapy, in addition to more than usual support from school authorities. He was seen 3 times weekly in therapy.." Mother was a social isolate who was over protective and father, a farmer, had little time for S and no patience with Ss problem. Instructions: After 1 week in the hospital, 30 minutes per day of relaxation training. Then fear hierarchies were constructed and reciprocal inhibition was begun. Condensed examples follow:

1) "Monday a.m. - rises, washes.
Has breakfast with mother.
Time for school bus
Rises, puts on jacket, heads for door.
2) On the bus.
Gets further from home and nearer to school
Bus stops at school.
Goes to school through side door.
Takes period of music and all is well.
Bell rings
Picks up books and moves down hall to next room
3) Gets home on the bus.
Finds door locked.
Bangs on the door - no answer
Sees a note - "parents visiting".
No known time of return.
He is to go to baby-sitters and sleep and wait for them."

CONDITIONS WITHIN: Time: admitted to hospital as a day-patient on January, 1964. Follow-up, December, 1965. Situation: school, hospital.

CONDITIONS OF EXPERIMENT: See Instructions

Chapel, 1967

PROCESS OPERATIONS: See Instructions and Procedure Parameters

✓

PROCEDURE PARAMETERS: "He continued out-patient contacts on a once-a-weeks basis and this rapidly extended to once a month, until the end of the school year in 1964 when he was promoted to Junior High School."

"First admission to day-school (January, 1964):
  Five initial sessions (30 minutes each) of relaxation by hypnosis.
  Eighteen sessions (20-30 minutes each) of reciprocal inhibition therapy, presenting an average of four hierarchies per session.
Second admission to day-school (September, 1964):
  Fifteen sessions (20-30 minutes each) of reciprocal inhibition therapy, presenting an average of seven hierarchies per session."

SEQUENCING RULES: See Instructions and Procedure Parameters

OUTCOME: "The boy's anxiety rapidly subsided and within 6 weeks he had pronounced himself ready to return to school.".. Since the Fall of 1964, there have been no problems whatever in school."..When seen in December, 1965, for follow-up he was free of anxiety relating to the school situation."

Appendix H

OPERATIONS ANALYSIS STAFF

University of Tennessee

1967-1968	Robert M. Adams Robert M. James Benjamin B. Lahey, Jr. William S. Verplanck (principal investigator)
1968-1969	Robert M. Adams Aaron Botbyl, Jr. Benjamin B. Lahey, Jr. John R. Schnelle William S. Verplanck (principal investigator)
1969-1970	Robert G. Bauer Aaron Botbyl, Jr. Benjamin B. Lahey, Jr. John R. Schnelle William S. Verplanck (principal investigator)
1970-1971	Robert G. Bauer Aaron Botbyl, Jr. Patrick R. Harrison Thomas F. Herrmann William S. Verplanck (principal investigator)
1971-1972	Patrick R. Harrison Thomas F. Herrmann William S. Verplanck (principal investigator)

This final report has been prepared by William S. Verplanck and Thomas F. Herrmann. The survey of the behavior modification literature was prepared by Aaron Botbyl, Jr., with the specific collaboration of Patrick R. Harrison.

Appendix III

☆ U. S. GOVERNMENT PRINTING OFFICE: 1967 — 2. · 145

Department of Health, Education, and Welfare

Grant No. OEG-4-9-520116-0036-057

NAME AND ADDRESS OF GRANTEE INSTITUTION

The University of Tennessee
Office of the Treasurer
Knoxville, Tennessee 37916

TRANSACTION NO.

INSTITUTIONAL ID NO. 399-3218

DATE OF THIS REPORTING PERIOD FROM 4/1/69 TO 9/30/70

PROJECT PERIOD FROM 4/1/69 TO 9/30/70

☒ CHECK IF FINAL REPORT

1. Expenditures of DHEW Funds for this Report Period

a. Personnel	$ 26,913.93	h. Alterations and renovations	
b. Consultant services	100.00	i. Other Publications	40.00
c. Equipment		Staff Benefits Miscellaneous	184.34 607.40
d. Supplies	1,580.48	j. Total direct costs	30,248.13
e. Travel, domestic	821.97	k. Indirect costs: Rate ____% ☒ S&W ☐ TDC	▨
f. Travel, foreign		Base $ ~~17,977.35 @ 54.2%~~ 8,936.58 @ 36%*	12,960.87
g. Patient care costs		l. TOTAL	$ 43,209.00

2. Expenditures from Prior Periods (previously reported)	
3. Cumulative Expenditures	43,209.00
4. Total Amount Awarded - Cumulatively	43,209.00
5. Unexpended Balance (Item 4 less Item 3)	
6. Unliquidated Obligations	
7. Unobligated Balance (Item 5 less Item 6)	
8.a. Cost Sharing Information - Grantee Contribution This Period	7,206.41 **
b. % of Total Project Costs (Item 8a divided by total of Items 1 and 8a)	%
9.a. Interest/Income (enclose check)	
b. Other Refundable Income (enclose check)	

10. Remarks

* O/H rate at University of New Mexico is 36% of S&W

** Includes $3,697.65 contributed by The University of New Mexico

I hereby certify that this report is true and correct to the best of my knowledge, and that all expenditures reported herein have been made in accordance with appropriate grant policies and for the purposes set forth in the application and award documents.

Rhea E Burns Rhea E. Burns, Accountant
SIGNATURE OF INSTITUTION OFFICER

April 5, 1971
DATE

HEW-489 (REV. 9/67)

REPORT OF RESEARCH GRANT EXPENDITURES

BUDGET BUREAU NO. 122-R0119
APPROVAL EXPIRES AUG. 1968